

The Archaeological Excavation of  
MAMMOTH CREEK CAVE

Eastern California Museum  
Independence, California  
Paper No. 1 May, 1964

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MAMMOTH CREEK CAVE

Inyo County, California

Rollin Enfield and Grace Enfield  
Eastern California Museum  
Inyo County, California  
January 1964

Submitted to Dr. Leonard Carmichael  
Secretary, Smithsonian Institution  
Washington 25, D. C.

April, 1964



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### ABSTRACT

A cave containing pictographs, in the Sierra Nevada of Mono County, California, was excavated for the United States Forest Service by the Eastern California Museum. The unstratified midden contained artifacts of obsidian, chert, bone, shell, stone, pottery, steatite and glass. Numerical grouping in upper levels of typological traits associated with the protohistoric-historic sequence shifted in lower levels to projectile point and bead types of earlier temporal significance. Comparisons are made with excavated sites in Yosemite National Park, Vermillion Valley and Owens Valley, and with Mono County surface collections. Combined archaeological, stratigraphic and ethnographic data suggest an occupational time-span in excess of 700 years, encompassing two or possibly three cultural periods.

During the protohistoric-historic period the Owens Valley and Mono Lake Paiute, Yosemite Miwok, and Western Mono are thought to have used the Cave while hunting and foraging, or as a resting place while on trading expeditions across the Sierra Crest by way of Mammoth Pass. The report closes with an ethnographic account of the Owens Valley and Mono Lake Paiute.



## ABSTRACT

A cave containing ethnographic, in the Sierra Nevada of Mono County, California, was excavated for the United States Forest Service by the Eastern California Museum. The unstratified midden contained evidence of occupation, there bone, shell, stone, pottery, steel and glass. Numerous groups in upper levels of typological series associated with the prehistoric-historic sequence shifted in lower levels to prehistoric point and bead types of earlier cultural significance. Comparisons are made with excavated sites in Yosemite National Park, Vermillion Valley and Owens Valley, and with Mono County surface collections. Combined archaeological, stratigraphic and ethnographic data suggest an occupational time-span in excess of 700 years, encompassing two or possibly three cultural periods.

During the prehistoric-historic period the Owens Valley and Mono Lake Paines, Yosemite Mts., and Western Mono are thought to have used the Cave while hunting and foraging, or as a resting place while on trading expeditions across the Sierra Crest by way of Mammoth Pass. The report closes with an ethnographic account of the Owens Valley and Mono Lake Paines.



#### ACKNOWLEDGEMENTS

Present at the preliminary survey of the Mammoth Creek Cave site were Arthur Selin and Kenneth Chilman, United States Forest Service; Emma L. Davis, University of California at Los Angeles; James Corbett and William Tennis, Archaeological Survey Association of Southern California; Mr. and Mrs. Rollin Esfield, Eastern California Museum.

Excavation help was given by James Corbett, William Tennis, Alex and Sandy Aposteloides, Judy Rockwell, Ray and Peggy Gray, Chuck and Marin Spencer, Ron and Nancy Smith, Ben and Anna Douglass, Bob Brackett, and Walt Schloer. Most consistent in attendance and long hours of work were Norman Weller, Arthur Selin, Kenneth Chilman, Dan Young, and Mr. and Mrs. E. C. Rockwell.

Special Thanks to Raymond F. Gray for the geologic report, Arthur Selin for the report on the ecology of the surrounding area, Dr. J. R. Macdonald, Curator of Vertebrate Paleontology, Los Angeles County Museum, Bob Toth, Department of Fish and Game, and Ed Sneagus, U. S. Forest Service for identification of bone, Ruth Fryling for typing this manuscript, and E. C. Rockwell for photographs of the excavation. Appreciation to Genny Schumacher for permission to quote from The Mammoth Lakes Sierra.

We are particularly grateful for the essential professional assistance so generously given by Emma L. Davis of the University of California, and Ruth DeEtte Simpson, Associate Curator of the Southwest Museum.



ACKNOWLEDGEMENTS

Present at the preliminary survey of the Mammoth Green Cave site were Arthur Keith and Kenneth Chalmers, United States Forest Service; Hans I. Davis, University of California at Los Angeles; James Corbett and William Tennille, Archaeological Survey Association of Southern California; Mr. and Mrs. Nellie Enfield, Eastern California Museum.

Excavation help was given by James Corbett, William Tennille, Alvin and Sandy Appleton, Judy Rockwell, Ray and Peggy Gray, Chuck and Nina Steiner, Sam and Nancy Selch, Ben and Anna Douglas, Bob Haskett, and Will Scholer. Much assistance in residence and long hours of work were Norman Keller, Arthur Keith, Kenneth Chalmers, Dan Young, and Mr. and Mrs. E. C. Rockwell.

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## INTRODUCTION

### THE PURPOSE

This report of archaeological excavation in Mammoth Creek Cave is the result of a joint project undertaken by the Mammoth District of the Inyo National Forest, and the Eastern California Museum.

Mr. Arthur Selin and Mr. Kenneth Chilman in charge of the Forest Service Visitor Information Program in the Mammoth District, recognizing the archaeological potential of Mammoth Creek Cave and its value as an educational exhibit if its human story could be told to National Forest visitors, requested the Eastern California Museum, the University of California, and the Southwest Museum for archaeological assistance.

The purpose was to gain and record information concerning the way of life of the prehistoric inhabitants of Mammoth Creek Cave, derived from the artifact assemblage, ecological setting, related archaeological data, and the ethnographic record.

### THE SETTING

Mammoth Creek Cave, locally known as the Mammoth Indian Caves, is located in Mono County, California, on the eastern slope of the Sierra Nevada in Mammoth Creek Valley, two miles southeast of the community of Mammoth Lakes, and thirty-five miles north of Bishop, the principal city in Owens Valley. The Cave is situated on Mammoth Creek, one fourth mile below the Sherwin Creek junction at an elevation of 7200 feet, in the NE $\frac{1}{4}$  of the NW $\frac{1}{4}$  of Section 6; T.4S; R.28E; as shown on the Mt. Morrison 30' U.S.G.S. Topographic Map. (Map 1, Plate 1)

Rising in alpine lakes just east of the Sierra Crest, Mammoth Creek descends eastward through wooded slopes, sagebrush flats and meadows, to enter the Owens River in Long Valley at an elevation of 6600 feet. Mammoth Creek Cave, a tri-part cavity, is situated low in the east wall of a narrow canyon cut by Mammoth Creek in lava hills covered with Jeffrey pine, white fir, bitterbrush and sagebrush. Aspen and willow grow by the water's edge. (Plate 1) Obsidian flaking debris litters the ground within a 50 yard radius of the Cave, and a ring of volcanic boulders, 8 feet in diameter, perhaps a hunting blind, overlooks Mammoth Creek on the periphery of the flaking area.



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Alpine in alpine lakes just east of the Shoshone Creek, Mammoth Creek descends eastward through wooded slopes, across brush flats and meadows, to enter the Owens River in long Valley at an elevation of 6800 feet. Mammoth Creek Cave, a cliff-cavity, is situated low in the east wall of a narrow canyon cut by Mammoth Creek in lava hills covered with Jeffrey pine, white fir, bitterbrush and sagebrush. Aspen and willow grow by the water's edge. (Plate 1) Grassland flanking debris litter the ground within a 50 yard radius of the Cave, and a ring of volcanic boulders, 8 feet in diameter, perhaps a hunting blind, overlooks Mammoth Creek on the periphery of the flanking area.



## PRIOR ARCHAEOLOGICAL WORK

The archaeological potential of Mono County has never been fully explored, possibly due to its rugged topography and geographical isolation.

Archaeological field work in Mono County was initiated by Garrick Mallery. During his extensive survey of American Indian picture writing, Mallery (1886-93) visited several petroglyph locations in southern Mono County and described numerous design elements. Mallery's work on the Mono County petroglyphs has been augmented by the studies of Steward (1929), Davis (1961:236-39) and Heizer and Baumhoff (1962). Design elements occurring on petroglyph rocks at four sites in southern Mono County are predominately Great Basin Curvilinear Style, tentatively dated from 1000 B.C. to A.D. 1500 (Heizer and Baumhoff 1962: 330-60, Pl. 21g; Figs. F-39 a-d, F-40 a-c, F-41).

Possibly the earliest published reference to the occurrence of archaeological pottery in Mono County is Steward's (1933:267) description of a dark-gray pottery vessel, now recognized as Owens Valley Brown Ware, found in association with stone "house rings" at Mono 13, near Chidage Canyon, 14 miles north of Bishop, California. Two decades later, Keith Dixon (1953:97-104) recorded a Sandia-like point, found on the surface in Long Valley about 10 miles east of the Mammoth Lakes Post Office.

During 1955 a surface survey of archaeological resources in Mono County was undertaken by Clement W. Meighan (1955:6-26). Five small environmental life zones north and south of Mono Lake were investigated. The 315 recorded sites included petroglyphs, obsidian quarries, workshops, bedrock mortars and metates, rock rings, hunting blinds, hunting and gathering camps, and settlements on stream and river banks. Surface collections included projectile points, scrapers, drills, knives, semi-portable metates, manos, and Owens Valley Brown Ware potsherds. Projectile points showed a marked variation in size and shape, indicating at least two periods of occupation: "There appears to be a late prehistoric period characterized by small corner notched points, and an earlier period containing larger and coarser points of several varieties" (Meighan 1955:13). On the basis of typological comparisons, Meighan (1955:18, 21) concluded that although there is similarity between the Mono County materials and specimens from Sierran sites, the cultural affiliations of Mono County lie primarily with the Great Basin and the southern California deserts.

Mono Lake Valley was examined between 1959 and 1961 and the archaeology briefly reported by Davis (1959:67-70; 1962:23-8). Surface collections seem to correspond to Meighan's Mono County material. A late date is suggested for a child burial near Mono Lake, accompanied by two bone awls, a bone pendant, and



# PRELIMINARY ANTHROPOLOGICAL WORK

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Recently the earliest published reference to the occurrence of archaeological pottery in Mono County is Steward's (1933:207) description of a dark-grey pottery vessel, now recognized as Swann Valley Brown Ware, found in association with stone "house" pits at site 1, near Chicago Canyon, 14 miles north of Bishop, California. Two decades later, Keith Dixon (1953:97-104) reported a Sandoz-like point, found on the surface in Long Valley about 10 miles east of the Mammoth Lakes Post Office.

During 1955 a surface survey of archaeological resources in Mono County was undertaken by Clement W. Meighan (1955:0-23). Five small environmental life zones north and south of Mono Lake were investigated. The 115 recorded sites included petroglyphs, obsidian quarries, workshops, bedrock mortars and metates, rock rings, hunting blinds, hunting and gathering camps, and several projectile points, scrapers, drills, knives, semi-portable tools, and Swann Valley Brown Ware sherds. Projectile points showed a marked variation in size and shape, indicating at least two periods of occupation. There appears to be a late prehistoric period characterized by small corner notched points, and an earlier period containing larger and coarser points of several varieties (Meighan 1955:15). On the basis of typological comparisons, Meighan (1955:18, 21) concluded that although there is similarity between the Mono County materials and specimens from Shasta sites, the cultural affiliations of Mono County lie primarily with the Great Basin and the northern California deserts.

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70 Olivella shells. Metate and lava bowl fragments were recovered in the midden deposit overlying the burial.

Projectile point collections found on the surface in Inyo and Mono Counties by private collectors were assembled for study in a series of Point Typology Workshops held in Owens Valley, beginning in 1960 under the direction of Ruth D. Simpson. To date 20 tentative groups have been established. Most of these contain numerous subdivisions. Records of size, weight and distribution are being compiled, as is information on various sites known to the collectors. Photographs have been made of all artifact assemblages brought to the workshops, and of representative specimens from all 20 classifications (Simpson 1961).



70 Olivella shells. Most and lava bomb fragments were recovered in the midden deposit overlying the burial.

Projectiles point collectors found on the surface in 1950 and 1951 by private collectors were assembled for study in a series of Point Typology Workshops held in Owens Valley, beginning in 1950 under the direction of Ruth D. Simpson. To date 10 tentative groups have been established. Most of these contain numerous subdivisions. Records of size, weight and distribution are being compiled, as is information on various sites known to the collectors. Photographs have been made of all artifact assemblages brought to the workshops, and of representative specimens from all 10 sites. (Simpson 1961).



## BACKGROUND

### GEOLOGIC SETTING

by  
Raymond F. Gray, Geologist

The rock over the cave is known as a vesicular olivine basalt. This is a variety of lava which is known for its ability to cover large areas with thin, fluid flows. The flow poured out onto the surface in a red hot state and ran over the ground in the vicinity of the present cave and surrounding areas. This flow was full of tiny bubbles which were trapped within the rock and solidified there. They are now quite visible to the observer without even a magnifying glass. With a good magnifying glass the observer can also see small honey-colored blobs of olivine crystals and obscure shiny spots of almost colorless feldspar crystals.

This vesicular olivine basalt ran over a surface of older solidified volcanic rock fragments full of coarse bubbles. This bubble-filled but dense rock is called scoria. Since the time of its formation to the present, the scoria partially decomposed beneath the basalt flow into a mass of red clay and fragments of the original scoria.

After the basalt flow, the surface was showered with volcanic ash composed of pieces of scoria. Some of these were twisted and solidified while still in the air into forms known as volcanic bombs. The pieces can be found north of the creek up in the flat in the sagebrush.

After the formation of the volcanic rocks, Mammoth Creek had this new surface to drain. The creek flowed across the lowest part of the scoria and basalt flow. It slowly washed away the loose material from the surface and wore down through the dense basalt flow. This action formed the gorge and the setting for the present cave.

After the gorge had been cut beneath the dense, hard basalt, some of the loose material beneath the basalt tumbled into the stream. This made a partial overhang - the beginning of the present cave. At this time it is possible that humans carried out additional loose material to enlarge the cave.

During the formation of the gorge and the overhanging basalt, large chunks of undermined basalt broke off and fell to the foot of the cliff. These are found around the entrance of the cave.

At the present time Mammoth Creek is actively cutting the gorge deeper.



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During the formation of the gorge and the overhanging basalt, large chunks of undrained basalt broke off and fell to the foot of the cliff. These are found around the entrance of the cave.

At the present time Mammoth Creek is actively cutting the gorge deeper.



## ECOLOGICAL RELATIONSHIPS

by

Arthur Selin, U. S. Forest Service

Winter snows in the Mammoth Creek Cave area have undoubtedly been heavy enough to preclude year-long occupancy by historic and prehistoric Indians. Perhaps hunters, seed gatherers, and trans-Sierra traders accounted for a large part of the seasonal use of these caves. The caves also offered considerable protection during inclement weather.

The presence of hunting blinds along Mammoth Creek indicates that large game may have been prevalent, at least during more recent years. The Inyo Mule Deer is now a common sight in the surrounding area. It has probably been present for centuries, though in far fewer numbers. The overgrazing of sheep by 19th century sheepherders caused a change in the Great Basin vegetation. Various shrubs including bitterbrush, which is essential to the diet of the mule deer, began to grow in former bunchgrass valleys and meadows. Prior to modern times and the influx of the Inyo Mule Deer, the Antelope and Bighorn sheep may have been a prime source of food for the early Indian. Small game included various rodents and birds. The rabbit was particularly important because it provided meat, and skins for blankets.

Fish were not abundant. The Mammoth City Herald of 1879 states that the nearest fish were the suckers found in Convict Lake; the closest native trout were in the Walker River. Indians caught brook trout in the San Joaquin River and sold them to the miners at Mammoth City. However these trout resulted from plantings on the west side of the Sierra. Prehistoric Indians apparently had a limited fishery in the Mammoth Lakes area.

The nearest pinyon pines are found about 1½ miles northwest of the Mammoth Creek Caves. The abundance of this pine in the Mono area provided a nearby source of food during good seed years. The Piuga or Pandora moth larvae in the surrounding Jeffrey pine forest was a valuable food source as was Kutsavi, the pupae of the fly found farther north on the shores of Mono Lake.

Local sagebrush provided fuel and clothing. Wild rose stems could have been used in the preparation of tea. Wyethia, a member of the sunflower family, provided seeds during gathering time. Wild onions were a favored vegetable as were other succulent plants found along the stream. Numerous willows provided raw material for the basketmakers.



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The nearest piñon pines are found about 15 miles north-west of the Mammoth Creek Caves. The abundance of this pine in the Mono area provided a nearby source of food during good seed years. The piñon or Ponderosa moth larvae in the surrounding Jeffrey pine forest was a valuable food source as was the pupae of the fly found farther north on the shores of Mono Lake.

Local sagebrush provided fuel and clothing. Wild rose stems could have been used in the preparation of tea. Wyeethia, a member of the sunflower family, provided seeds during gathering times. Wild onions were a favored vegetable as were other succulent plants found along the stream. Numerous willows provided raw material for the basketmakers.



Varying qualities of obsidian for the making of weapons and implements were found in several locations not too many miles from these caves. Nearby hot springs may have been used for bathing purposes.

The early occupants of Mammoth Creek Cave depended for their livelihood on the often harsh volcanic lands about them. Their ingenuity allowed them to make the most of this limited mountain and desert environment.

#### ETHNOGRAPHIC RELATIONSHIPS

Mammoth Creek Cave lies within the territory of historic Shoshonean speaking Northern Paiute groups who occupied the valleys along the eastern base of the Sierra Nevada and the adjacent slopes to the Sierra Crest. Historic and ethnographic Northern Paiute settlements in the Mono Lake Valley 30 miles to the north, and Owens Valley 30 miles to the east and the south were recorded by Steward (1933).

West of the Sierra Crest were their neighbors and friends, the Pautian speaking Central and Southern Miwok of the Yosemite region bordering Mono Valley (Barrett and Gifford 1933), and the Western Mono whose lands along the upper San Joaquin River drainage joined Owens Valley territory. Owens Valley Paiute intermingled with the Western Mono, their linguistic and cultural kin. Mono Lake Paiute used Little Yosemite as a summer hunting camp, often wintered in Yosemite, and intermarried with Miwok (Steward 1933).

According to Steward (1933), extensive trans-Sierra trade was carried on between Mono Lake and Miwok territory; Owens Valley and Western Mono, people crossing from both sides. Mammoth Pass, approached from the east through Mammoth Creek Valley, was one of three main Sierra passes used by the latter groups (Hinds 1959:12, 13). Trade items summarized by Davis (1961) include: pine nuts, Pandora moth caterpillars, Kutsavi, obsidian and unfinished obsidian arrowpoints, rabbitskin blankets, sleeveless buckskin jackets, mountain sheep skins, red and white paint, supplied by Owens Valley and Mono Lake Paiute to the Western Mono and Miwok in exchange for arrows, fine Yokute baskets, steatite, clamshell disk beads, shell bead money, glass beads (in historic times), acorns and acorn meal, manzanita berries, elderberries, squaw berries and a fungus used in paint.



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## ETHNOGRAPHIC RELATIONSHIPS

Mammoth Creek Cave lies within the territory of Shoshonean speaking Northern Paiute groups who occupied the valleys along the eastern base of the Sierra Nevada and the adjacent slopes to the Sierra Crest. Historic and ethnographic Northern Paiute settlements in the Mono Lake Valley 30 miles to the north and Owens Valley 30 miles to the east and the south were recorded by Steward (1933).

West of the Sierra Crest were their neighbors and friends, the Paiutean speaking Central and Southern Miwok of the Yosemite region bordering Mono Valley (Barrett and Gilford 1933), and the Western Mono whose lands along the upper San Joaquin River drainage joined Owens Valley territory. Owens Valley Paiute intermingled with the Western Mono, their linguistic and cultural kin. Mono Lake Paiute used little Yosemite as a summer hunting camp, often wintered in Yosemite, and intermingled with Miwok (Steward 1933).

According to Steward (1933), extensive trade-Sierran trade was carried on between Mono Lake and Mijok territory; Owens Valley and Western Mono, people crossing from both sides. Mammoth Cave, approached from the east through Mammoth Creek Valley, was one of three main Sierra passes used by the latter groups (Hinds 1939:12, 13). Trade items mentioned by Davis (1901) include: pine nuts, Pandora rock anaspillars, raw, obsidian and unfinished obsidian arrowpoints, rabbit skin, blankets, miscellaneous buckskin jackets, mountain sheep skins, red and white paint, supplied by Owens Valley and Mono Lake Paiute to the Western Mono and Mijok in exchange for arrows. The former baskets, stoves, glass beads, shell, bone money, glass beads (in historic times), spurns and acorn meal, manzanita berries, elderberries, spum berries and a fungus used in paint.



## EXCAVATION and CULTURAL DEPOSITS

### DESCRIPTION

Mammoth Creek Cave is composed of three cavities: two adjacent outer cavities facing Mammoth Creek, and an inner chamber. At the rear of each outer cave is a natural tunnel; each tunnel leads to the inner chamber. Access to the inner chamber is restricted to these two tunnels (Fig. 3).

The northern outer cave, which was chosen for excavation and described as Cave #1, is the largest of the three, measuring 34 feet in width at the mouth, 26 feet from front to back, and 9 feet, its greatest height, at the frontal overhang. Floor level slopes gently upward from the front entrance to the rear wall. Ceiling and walls are blackened with a thick coating of soot.

Surface evidence of former human habitation included numerous obsidian flakes, potsherds, fire-cracked rocks and smoothed stone fragments. Two small groups of pictograph designs painted in white decorate the north wall and ceiling. (Plate 7c)

Relic hunters had dug a large pit near the north wall of the cave beneath the pictographs, and several smaller pits near the front entrance. For this reason it was decided to first excavate an exploratory trench 2 feet wide running east and west in the relatively undisturbed area extending from the center of the cave to the tunnel entrance in the rear wall, the trench to be excavated in 2 foot squares in order to establish accurate provenience for each artifact.

The Main Datum Point (A) was established and marked by a steel bar  $\frac{1}{2}$  inch in diameter and 6 inches in length, cemented in a drilled hole in the rear (east) wall 34 inches above floor level and north of the tunnel entrance (Plate 2A). From Datum Point A, the Main Bearing Line was established due east and west to a point marked on an aspen tree just west of the cave mouth. Corner stake #1 was set 10 inches due south of Datum Point A, vertical measurement from the Main Bearing Line being 32 inches. Corner stake #2 was set 24 inches due south of stakes #1; corner stakes #3 and #4 were set 24 inches due west of stakes #1 and #2 respectively, forming square #1 of the exploratory trench. This is now square #2 in the final grid which contains 24 two foot squares in a rectangle 8 feet by 12 feet, and Wing #1 approximately 2 feet by 4 feet adjacent to squares #4 and #5 (Figs. 4, 5).

Excavation of the exploratory trench (and later of the entire grid) proceeded by means of arbitrary 6 inch vertical



# EXCAVATION and CULTURAL DEPOSITS

## DESCRIPTION

Manotash Creek Cave is composed of three cavities: two adjacent outer cavities facing Manotash Creek, and an inner chamber. At the rear of each outer cave is a natural tunnel; each tunnel leads to the inner chamber. Access to the inner chamber is restricted to three tunnels (Fig. 3).

The northern outer cave, which was chosen for excavation and described as Cave #1, is the largest of the three, measuring 12 feet in width at the mouth, 20 feet from front to back and 9 feet 11 inches greatest height at the front overhang. Floor level slopes gently upward from the front entrance to the rear wall. Ceiling and walls are blackened with a thick coating of soot.

Scarcely evidence of former human habitation remained. Numerous obsidian flakes, possibly lithic, and several groups of lithic fragments. Two small groups of lithic fragments painted in white decorate the north wall and ceiling. (Plate 7c)

Before entering had dug a large pit near the north wall of the cave beneath the photographs, and several smaller pits near the front entrance. For this reason it was decided to first excavate an exploratory trench 2 feet wide running east and west in the relatively undisturbed area extending from the center of the cave to the tunnel entrance in the rear wall. The trench to be excavated is 2 foot square in order to establish accurate provenience for each artifact.

The Main Datum Point (A) was established and marked by a steel bar 1 inch in diameter and 8 inches in length, cemented in a drilled hole in the rear (west) wall 14 inches above floor level and north of the tunnel entrance (Plate 3a). From Datum Point A, the Main Bearing Line was established due east and west to a point marked on an upper tree just west of the cave mouth. Corner stake #1 was set 10 inches due south of Datum Point A, vertical measurement from the Main Bearing Line being 12 inches. Corner stake #2 was set 24 inches due south of stake #1; corner stakes #3 and #4 were set 24 inches due west of stakes #1 and #2 respectively, forming square #1 of the exploratory trench. This is now square #5 in the final grid which contains 24 two foot squares in a rectangle 6 feet by 12 feet, and King #1 approximately 2 feet by 4 feet adjacent to square #4 and #5 (Fig. 4, 5).

Excavation of the exploratory trench (and later of the entire grid) proceeded by means of arbitrarily 6 inch vertical



levels with the hope that natural levels of accumulation could be distinguished with increasing depth.

At approximately 12 inches depth in the exploratory trench the appearance of large roots, and boulder-sized volcanic rocks in the unstable deposits made it advisable to establish the grid system of excavation to avoid mixing of the cultural materials. Twenty additional 2 foot squares and a "wing" were opened adjacent to the trench, and the resulting grid worked by step levels. All deposits were troweled, or shoveled when necessary, and sifted through 1/8 inch or 1/4 inch screens as indicated by the nature of the material.

### DEPOSITS

The surface deposit composed of dry, powdery, grayish sand and dust, leaves, twigs, rodent droppings, and obsidian flakes, graded swiftly and imperceptibly to a brownish-gray, dry sandy-loam laced with intruding roots and angular volcanic rocks scaled from the ceiling and walls. Mingled with charcoal and ash, rodent droppings, fire-cracked stones and fragmented animal bone, were artifacts of stone, bone, shell, chert, obsidian, pottery and glass. The midden with its associated artifacts extended to a fairly uniform depth of 18 inches. Since physical stratification could not be discerned within the dry, friable midden deposit, the recovered cultural materials were recorded according to placement in established arbitrary 6 inch vertical levels: surface to 6 inches, Level V; 6 inches to 12 inches, Level IV; 12 inches to 18 inches, Level III (Fig. 5B).

Below 18 inches at the upper surface of Level II, the midden thinned and disappeared, the soil dampened, became coarse in texture with small angular pebbles and many rootlets, and changed in color to tannish-brown. An oval basin-shaped pit of fire-blackened earth, fine charcoal and ash, uncovered at a depth of 20 inches was located in adjacent portions of squares 10, 11, 14, 15 and centered 8 inches west and 8 feet 7 inches below Datum Point B placed on the shelter ceiling. The pit measured 24 inches east-west diameter, 28 inches north-south diameter and 12 inches deep, the base being 32 inches below floor surface (Plate 2B). Directly below the pit at 32 inches depth obsidian flakes and a crude knife-like tool were found in a pocket of loose cream-colored earth. The next 3 inch level disclosed no soil change and was sterile of artifacts other than several small flakes of obsidian.

The decision then made to continue excavation in a limited area 4 feet by 6 feet in the exact center of the grid designated as Section E (Level I), was based on the remote possibility that a cultural deposit might exist beneath the sterile soil. Subsequent excavation in Section E disclosed 17 inches of



levels with the hope that natural levels of accumulation could be distinguished with increasing depth.

At approximately 12 inches depth in the exploratory trench the appearance of large roots, and boulder-sized volcanic rocks in the unstable deposits made it advisable to establish the grid system of excavation to avoid mixing of the original materials. Twenty additional 2 foot squares and a wing were opened adjacent to the trench, and the resulting grid worked by step levels. All deposits were removed, or removed when necessary, and sifted through 1/8 inch or 1/4 inch screens as indicated by the nature of the material.

### DEPOSITS

The surface deposits composed of dry, powdery, grayish sand and dust, leaves, twigs, rodent droppings, and occasional flakes, pushed swiftly and laterally to a brownish-gray, dry sandy loam interbedded with thinning roots and angular volcanic rocks scoured from the ceiling and walls. Mottled with charcoal and ash, rodent droppings, lime-crusted strands and fragmented animal bones, were evidence of human, bone, shell, other, obsidian, pottery and glass. The midden with its associated artifacts extended to a fairly uniform depth of 18 inches. Since physical stratification could not be discerned within the dry, friable midden deposit, the recovered cultural materials were recorded according to placement in established arbitrary 6 inch vertical levels: surface to 6 inches, level V; 6 inches to 12 inches, level IV; 12 inches to 18 inches, level III (Fig. 28).

Below 18 inches at the upper surface of level II, the midden thinned and disappeared, the soil dampened, became coarse in texture with small angular pebbles and many rootlets, and changed in color to tanish-brown. An oval basin-shaped pit of lime-blancheted earth, lime charcoal and ash, uncovered at a depth of 30 inches was located in adjacent portions of squares 10, 11, 12 and centered 8 inches west and 8 feet 7 inches below datum point B placed on the shelter ceiling. The pit measured 24 inches east-west diameter, 28 inches north-south diameter and 12 inches deep, the base being 12 inches below floor surface (Place 28). Directly below the pit at 32 inches depth obsidian flakes and a crude knife-like tool were found in a pocket of loose green-colored earth. The next 3 inch level disclosed no soil change and was sterile of artifacts other than several small flakes of obsidian.

The decision then made to continue excavation in a limited area 4 feet by 8 feet in the exact center of the grid designated as Section E (level I), was based on the remote possibility that a cultural deposit might exist beneath the sterile soil. Subsequent excavation in Section E disclosed 17 inches of



coarse wet reddish-brown scoria clay, sterile of artifacts other than 8 tiny obsidian flakes, and a final 8 inch layer of similar earth hardened with perma-frost. Total depth of excavation was 5 feet.

A test pit 16 inches deep was excavated along the north wall, east of the pictographs. The pit measured 54 inches from east to west; 36 inches from north to south. The northeast corner stake was placed 32 inches west and 74 inches north of Datum Point A. The midden deposits were shallow, reaching a maximum depth of 10 to 12 inches, but corresponded in content with those of similar depth in the main excavation. Boulders and shelf-rock were encountered between 12 and 16 inches (Fig.4).

In summary, the arbitrary levels V, IV, and III with a total depth of 16 inches comprised the unstratified midden deposit, laid down on Level II, a 17 inch stratum of coarse, tannish-brown dampened scoria soil, containing a basin-like pit of concentrated charcoal and ash. Level I, totalling 25 inches in depth, was a coarse, reddish-brown scoria clay sterile of artifacts, quite wet, and finally hardened with perma-frost. The extremely loose, nearly homogeneous nature of the cultural level is possibly typical of caves which received only occasional, temporary use. It may also be possible that burrowing rodents and human activity have caused some mixing of the archeological materials.



coarse red-brown siltstone clay, sterile of artifacts  
 other than a clay pebble layer, and a final 8 inch layer  
 of similar earth hardened with pebbles. Total depth  
 of excavation was 5 feet.

A test pit 18 inches deep was excavated along the north  
 wall, east of the photograph. The pit measured 24 inches from  
 east to west; 36 inches from north to south. The northern  
 corner stake was placed 12 inches west and 14 inches north of  
 Baton Point A. The siltstone deposits were shallow, reaching a  
 maximum depth of 16 to 18 inches, but corresponded in content  
 with those of similar depth in the main excavation. Siltstone  
 and shell-rock were encountered between 12 and 18 inches (Fig. 4).

In summary, the arbitrary levels I, II, III, IV, and V with a  
 total depth of 18 inches comprised the stratified midden  
 deposits, laid down on level II, a 17 inch stratum of coarse  
 tanish-brown dampened siltstone soil, containing a basin-like  
 pit of concentrated charcoal and ash. Level I, totaling  
 12 inches in depth, was a coarse red-brown siltstone clay  
 sterile of artifacts, plus wet and finally hardened with  
 pebbles. The extremely loose, nearly homogeneous nature  
 of the cultural level is possibly typical of caves which  
 received only occasional, temporary use. It may also be  
 possible that burrowing rodents and human activity have  
 caused some mixing of the archaeological materials.



## THE ARTIFACTS

### PROJECTILE POINTS

14 projectile points capable of classification were recovered from Mammoth Creek Cave (Fig. 1, Pl. 3).

#### Type 1 Points: Desert Side-Notched

Small points with triangular blades, side notches, and concave, V-shaped or notched bases. The type, named Desert Side-Notched, is segregated into General, Sierra, Delta, and Redding sub-types (Baumhoff and Byrne 1959:32-8; Pl. 1a-x). A total of 5 specimens were excavated from Mammoth Creek Cave from Levels V (0"-6"), IV (6"-12"), III (12"-18").

##### Sub-type 1a. Concave base: General Sub-type

- a. EA-26 Material: clear obsidian; length (minus tip) 20 mm; width 11 mm; thickness 2 mm; weight 0.4 gms. Level III
- b. EA-18 Material: black opaque obsidian; length (minus tip) 29 mm; width 13 mm; thickness 3.5 mm; weight 0.9 gms. Level IV

##### Sub-type 1b. Notched base: Sierra Sub-type

- c. EA-1 Material: black opaque obsidian; length (minus tip) 14 mm; width 10 mm; thickness 2 mm; weight 0.4 gms. Level V
- d. EA-7 Material: black opaque obsidian; length (minus tip) 19 mm; width (reconstructed) 12 mm; thickness 3 mm; weight 0.6 gms. Level V

##### Sub-type 1c. V-shaped base: Delta Sub-type

- e. EA-11 Material: dark-gray translucent obsidian; length (minus tip) 30 mm; width (reconstructed) 12 mm; thickness 3.5 mm; weight 1.2 gms. Level V

#### Type 2 Points:

Small triangular points with straight base and slightly convex sides. A total of 2 specimens.

- f. EA-24 Material: black opaque obsidian; length 17 mm; width 13 mm; thickness 2 mm; weight 0.7 gms. Level III
- g. EA-12 Material: clear gray-banded obsidian; length 31 mm; width 15 mm; thickness 3 mm; weight 1.6 gms. Level V



# THE ARTIFACTS

## PROJECTILE POINTS

14 projectile points capable of classification were recovered from Kanosh Creek Cave (Fig. 1, Pl. 3).

### Type 1 Points: Basal Side-Notched

Small points with triangular blades, side notches, and concave, V-shaped or notched bases. The type, named Basal Side-Notched, is represented here generally, Basal Side-Notched, and Basal Side-Notched (Hammell and Byrne 1959:8, Pl. 1a-x). A total of 5 specimens were excavated from Kanosh Creek Cave from Levels V (0-5), IV (5-12), III (12-18).

#### Sub-type 1a. Concave base: General Sub-type

- a. HA-26 Material: clear obsidian; length (minus tip) 20 mm; width 11 mm; thickness 3 mm; weight 0.4 gms. Level III
- b. HA-18 Material: black opaque obsidian; length (minus tip) 29 mm; width 13 mm; thickness 3.5 mm; weight 0.9 gms. Level IV

#### Sub-type 1b. Notched base: Basal Sub-type

- c. HA-1 Material: black opaque obsidian; length (minus tip) 14 mm; width 10 mm; thickness 2 mm; weight 0.4 gms. Level V
- d. HA-7 Material: black opaque obsidian; length (minus tip) 19 mm; width (reconstructed) 12 mm; thickness 3 mm; weight 0.6 gms. Level V

#### Sub-type 1c. V-shaped base: Basal Sub-type

- e. HA-11 Material: dark-grey translucent obsidian; length (minus tip) 30 mm; width (reconstructed) 12 mm; thickness 3.5 mm; weight 1.2 gms. Level V

### Type 2 Points:

Small triangular points with straight base and slightly convex sides. A total of 2 specimens.

- f. HA-14 Material: black opaque obsidian; length 17 mm; width 13 mm; thickness 2 mm; weight 0.7 gms. Level III
- g. HA-12 Material: clear grey-banded obsidian; length 11 mm; width 12 mm; thickness 3 mm; weight 1.0 gms. Level V



### Type-3-Points

Small points with short tangs, expanding stems and straight to convex bases. A total of 2 specimens were recovered from Level V (0° to 6°).

- h. EA-10 Material: dark-gray opaque obsidian; length 30 mm; width 20 mm; thickness 3 mm; weight 1.7 gms.
- i. EA-4 Material: black opaque obsidian; length 27 mm; width (reconstructed) 20 mm; thickness 3 mm; weight 1.45 gms.

### Type 4 Points

Medium-sized heavy tanged point with expanding stem, concave base and serrated blade. 1 specimen was recovered from Level IV (6° - 12°).

- j. EA-19 Material: black opaque obsidian; length 40 mm; width (reconstructed) 26 mm; thickness 8.5 mm; weight 5.1 gms.

### Type 5 Points

Long thin triangular points with straight to convex bases. A total of 2 specimens were recovered from Levels IV (6°-12°) and III (12°-18°).

- k. EA-16 Material: clear obsidian; width 19 mm; thickness 4 mm; weight (base) 1.75 gms. Level IV.
- l. EA-28 Material: black opaque obsidian; width 26 mm; thickness 5 mm; weight (base) 3.7 gms. Level III.

### Type 6 Points

Large heavy tanged points with contracting stems. A total of 2 specimens were recovered from Levels IV (6°-12°) and III (12°-18°).

- m. EA-23 Material: Black opaque obsidian; width 24 mm; thickness 6.8 mm; weight (base) 3.55 gms. Level III.
- n. EA-14 Material: pinkish-gray and tan mottled chert; width 27 mm; weight (base) 4.9 gms.; thickness 8 mm. Level IV.



# Type 1 - Points

Small points with short range, expanding stems and straight to convex bases. A total of 2 specimens were recovered from Level V (0' - 5').

- N. 2A-10 Material: dark-gray opaque obsidian; length 30 mm; width 20 mm; thickness 3 mm; weight 1.7 gms.  
 1. 2A-4 Material: black opaque obsidian; length 27 mm; width (reconstructed) 20 mm; thickness 3 mm; weight 1.45 gms.

# Type 4 - Points

Medium-sized heavy ranged point with expanding stem, concave base and serrated blade. 1 specimen was recovered from Level IV (0' - 12').

1. 2A-19 Material: black opaque obsidian; length 40 mm; width (reconstructed) 20 mm; thickness 3 mm; weight 2.1 gms.

# Type 5 - Points

Long thin triangular points with straight to convex bases. A total of 2 specimens were recovered from Levels IV (0' - 12') and III (12' - 18').

2. 2A-10 Material: clear obsidian; width 19 mm; thickness 4 mm; weight (base) 1.75 gms. Level IV.  
 1. 2A-28 Material: black opaque obsidian; width 20 mm; thickness 5 mm; weight (base) 3.7 gms. Level III.

# Type 6 - Points

Large heavy ranged points with contracting stems. A total of 2 specimens were recovered from Levels IV (0' - 12') and III (12' - 18').

- N. 2A-23 Material: black opaque obsidian; width 24 mm; thickness 6.8 mm; weight (base) 3.25 gms. Level III.  
 N. 2A-14 Material: bluish-gray and tan mottled chert; width 27 mm; weight (base) 4.9 gms.; thickness 8 mm. Level IV.



## Discussion

### Type 1: Desert Side-Notched Points (Baumhoff and Byrne 1959)

Small points with triangular blades, side notches, concave (sub-type 1a), notched (sub-type 1b) or V-shaped (sub-type 1c) bases.

Desert Side-notched points, represented by the General (1a), Sierra (1b) and Delta (1c) subtypes (Baumhoff and Byrne 1959: Pl. 1a-x) comprise one-third of the classifiable projectile points excavated from Mammoth Creek Cave. A total of 5 specimens: 2 General, Levels III (12"-18") and IV (6"-12"); 2 Sierra and 1 Delta, Level V (0-6").

The General, Sierra and Delta sub-types were the most abundant small projectile points occurring on the surface of Historic Miwok sites and concentrated stratigraphically in top levels of excavated sites in Yosemite National Park (Bennyhoff 1958: Types A4, A5, Fig. 4j-g, pp 35-6). Similar specimens were found in the Type Site for historic and pre-historic Owens Valley Paiute, Site INY-2 (Riddell 1951: Types 7, 8, 9; Fig. 1). General and Sierra sub-types occurred in the Historic Western Mono site just west of the Sierra Crest in Vermillion Valley, Site Pre-115 (Lathrup and Schutler 1955: Fig. 67a-i).

The Desert Side-notched point appears earlier in the Southwest region than in California. Baumhoff and Byrne (1959: 59-61) estimate the date of introduction of General and Sierra sub-types into Owens Valley at A. D. 1300 and 1350 respectively; into the Central Sierra at A.D. 1400 and 1450. The Delta subtype appeared in the San Joaquin-Sacramento Delta region, its distribution center, and the Northern Sierra at about A.D. 1500.

Desert Side-notched points mark the Late Horizon in Central California and are the most abundant projectile points of the latest cultures in the Central and Southern Sierra and Inyo County (Baumhoff and Byrne 1959: 59-61).

### Type 2 Points

Small triangular straight-based points with slightly convex sides. A total of 2 specimens: Levels III (12-18") and V (0-6") (Fig. 1, Pl. 3).

Type 2 specimens are comparable to points found on the surface of an Historic Miwok site and in upper levels of excavated sites in Yosemite National Park, in association with General and Sierra, Desert Side-notched specimens. (Bennyhoff 1956: 37, Type A1; Fig. 4a-c). The type occurred in the Historic Western Mono Site in Vermillion Valley, Pre-115 (Lathrup and Schutler 1955: Fig. 67r-t); Long Valley, Mono County (Dixon 1953: Fig. 3c-d); Site INY-2, Type Site for historic and pre-historic Owens Valley Paiute (Riddell 1951: Type 5, Fig. 1).



Type 1. Heavy Side-Notched Points (Hammelf and Byrne 1959)

Small points with triangular blades, side notched, concave (and-type 1a), notched (and-type 1b) or V-shaped (and-type 1c) bases.

Heavy Side-Notched Points, represented by the General (1a).

Stems (1b) and (1c) subtypes (Hammelf and Byrne 1959: 71, 1a-1) comprise one-third of the classifiable projectile points excavated from Hammelf Creek Cave. A total of 2 specimens, 2 General, Levels III (12-13) and IV (14-15). 2 Stems and 1 Base, Level V (16-17).

The General, Stem and Base and-type points were the most abundant small projectile points occurring on the surface of Hammelf Creek site and concentrated stratigraphically in top levels of excavated sites in Yosemite National Park (Hammelf 1959: Types A1, A2, Fig. 41-4, pp 37-38). Similar specimens were found in the Type Site for Historic and proto-historic Owens Valley (Hammelf 1951: Type 1, Fig. 11). General and Stem sub-types occurred in the Hammelf Creek site just west of the Stem Creek in Yosemite Valley. Site 12-13 (Lachap and Schuster 1955: Fig. 37a-1).

The heavy side-notched point appears earlier in the South-west region than in California. Hammelf and Byrne (1959: 72-73) estimate the date of introduction of General and Stem sub-types into Owens Valley at A.D. 1300 and 1350 respectively. Into the Central Sierra at A.D. 1400 and 1450. The Base and-type appeared in the San Joaquin-Sacramento Delta region. The distribution eastern and the Northern Sierra at about A.D. 1500.

Heavy side-notched points with the late horizon in Central California and are the most abundant projectile points of the latest cultures in the Central and Southern Sierra and Lake County (Hammelf and Byrne 1959: 72-73).

Type 2 Points

Small triangular straight-based points with slightly convex sides. A total of 2 specimens: Levels III (12-13) and V (16-17) (Fig. 1, Fig. 2).

Type 2 specimens are comparable to points found on the surface of an Historic Mound site and in upper levels of excavated sites in Yosemite National Park, in association with General and Stem Heavy Side-Notched specimens. (Hammelf 1959: 77, Type A1, Fig. 4a-c). The type occurred in the Historic Western Mono Site in Yosemite Valley, 72-115 (Lachap and Schuster 1955: Fig. 37b-1); Lang Valley, Mono County (Lachap 1953: Fig. 30-4); Site 12-13, Type Site for Historic and proto-historic Owens Valley (Hammelf 1951: Type 2, Fig. 1).



Points similar to Type 2 specimens are of minor importance in Phase 2 of the Late Horizon in the Sacramento Valley (Bennyhoff 1956 38).

### Type 3 Points

Small points with short tangs, expanding stems and straight to convex bases. A total of 2 specimens Level V (0-6"). (Fig. 1, Pl. 3).

Type 3 points fall within the weight and size range of similar specimens (Type E10) occurring in intermediate levels of excavated sites in Yosemite National Park (Bennyhoff 1956 40, Fig. 4g). The type is found in the Historic Western Mono site in Vermillion Valley-Fre-115 (Lathrap and Schutler 1955 Fig. 67v-y). Owens Valley historic and protohistoric Paiute site, Iny-2 (Riddell 1951 Type 11, Fig. 1) and resembles certain Mono County specimens (Meighan 1955 Type 6, fig. 2; Pl. 3, Nos. 23-5).

Type 3 points are also within the size range but slightly exceed the 1 gram weight limit of somewhat similar specimens (Type A11) which occurred in association with General and Sierra, Desert Side-notched points, in upper levels of excavated sites in Yosemite National Park (Bennyhoff 1956 37, Fig. 4b). This form is widespread on all sides of the Yosemite region.

### Type 4 Points

Medium-sized heavy point with expanding stem, slightly concave base and serrated blade. A total of 1 specimen Level IV (6-12"), (Fig. 1, Pl. 3).

The Type 4 specimen can be correlated on the basis of size and weight (over 3.5 grams) with Class C points which occur in the deeper levels of excavated sites in Yosemite National Park (Bennyhoff 1956 32). The slender blade and concave base distinguish our Type 4 point from Bennyhoff's Type C13 to which it bears a resemblance (Fig. 2qv, Fig. 6k). The type occurs in Owens Valley (Riddell and Riddell 1956 Fig. 2, No. 3). A larger form occurs in Mono County (Meighan 1955 Pl. 4, no. 4).

Bennyhoff (1956 43) states "Although the sample is small it seems evident that the heavy points (Class C) represent an assemblage of earlier date than Class A types."

### Type 5 Points

Long thin triangular points with straight to convex basis. A total of 2 specimens: Levels III (12-18") and IV (6-12"). (Fig. 1, Pl. 3).



Points similar to Type 2 specimens are of minor importance in Phase 2 of the Late Bortone in the Sacramento Valley (Henry-  
bolt 1950 35).

### Type 3 points

Small points with sharp tangs, expanding stems and straight to convex bases. A total of 2 specimens Level V (8-12") (Fig. 1, Pl. 3).

Type 3 points fall within the weight and size range of similar specimens (Type E18) occurring in intermediate levels of excavated sites in Yosemite National Park (Henrybolt 1950 35, 36, 37, 38). The type is found in the Historic Western Mono site in Yosemite Valley-Fire-112 (Lathrop and Behrman 1955 112-113) and in the Valley Historic and Prehistoric Sites also, Jay-2 (Riddell 1951 Type 11, Fig. 1) and resembles certain Mono County specimens (Behrman 1955 Type 6, Fig. 2, Pl. 3, Nos. 23-24).

Type 3 points are also within the size range but slightly exceed the 1 gram weight limit of somewhat similar specimens (Type A11) which occurred in association with General and Sierra Nevada Side-shoulder points in upper levels of excavated sites in Yosemite National Park (Henrybolt 1950 37, Fig. 4b). This form is widespread on all sides of the Yosemite region.

### Type 4 points

Medium-sized heavy point with expanding stem, slightly concave base and notched blade. A total of 1 specimen Level IV (6-12") (Fig. 1, Pl. 3).

The Type 4 specimen can be correlated on the basis of size and weight (over 3.5 grams) with Class C points which occur in the deeper levels of excavated sites in Yosemite National Park (Henrybolt 1950 32). The slender blade and concave base distinguished our Type 4 point from Henrybolt's Type C13 to which it bears a resemblance (Fig. 2, Pl. 3). The type occurs in Owens Valley (Riddell and Riddell 1950 Fig. 2, No. 3) and larger forms occur in Mono County (Behrman 1955 Pl. 4, No. 4).

Henrybolt (1950 43) states "Although the sample is small it seems evident that the heavy points (Class C) represent an assemblage of earlier date than Class A types."

### Type 5 points

Long thin triangular points with straight to convex bases. A total of 2 specimens Levels III (12-18") and IV (6-12") (Fig. 1, Pl. 3).



Type 5 points fall within the weight range of Class B (1.1 gms. to 3.5 gms.) and class C (over 3.5 grams) projectile points from excavated sites in Yosemite National Park (Bennyhoff 1956 39, 41). However, our Type 5 specimens are longer and narrower than the triangular specimens recorded by Bennyhoff (Type B2, Fig. 4c d; Type C4, Fig. 5h, 1; Table 17).

Type 5 is represented in Mono County and in the Central Sierra (Weighan 1955 Type 1, Fig. 2; Pl. 3, Nos. 2-4, Table 3). Comparable specimens appeared in the Southwest just before the arrival of pottery and then persisted (Haury 1950 273; Fig. 56ef).

### Type 6 Points

Large heavy shouldered or tanged points with tapered stems. A total of 2 specimens levels III (12-18") and IV (6-12"); Fig. 1 Pl. 3.

Comparable points were obtained from deeper levels of excavated sites in Yosemite National Park (Bennyhoff 1956 Type C10, Fig. 1b; Type C14, Fig. 61). The type occurs in Mono County and the Central Sierra (Weighan 1955 Type 7, Fig. 2; Table 3). Type 6 specimens bear a general resemblance to Gypsum dart-points excavated from the lower levels of Gypsum Cave, Nevada and found on the shores of dry lakes in the Mohave Desert, California (Harrington 1933 Figs. 19, 54).

The heavy tapered-stem point may have had a long and continuous history: "It is my opinion that while in some regions it gave way entirely to the side-notched dart-point, considered in the Southwest to be typical of Basketmaker culture, in other places it lasted until the introduction of the bow-and-arrow rendered darts and dart-points obsolete." (Harrington 1933 119).

### KNIVES

A total of 8 artifacts classifiable as knives were recovered from the Mammoth Creek Cave site: 4 specimens from Level V (0-6"); 1 from Level IV (6-12"); 1 from Level III (12-18"); 1 from the surface near the inner cave entrance; and 1 from the surface of the rock-ring 50 yards Southwest of the Cave. (Pl. 4A)

All are obsidian, bifacially flaked with retouched edges, but vary considerably in size, shape, and workmanship. Two are heavily patinated. Length range is 3.3 to 11.5 cm. width range is 2.2 to 5.2 cm. thickness varies from 0.3 to 2.2 cm. weight varies from less than 2 gms. to 9.55 gms.



Type 5 points fall within the weight range of Class B (11.1 gms. to 3.5 gms.) and class C (over 3.5 grams) projectile points from excavated sites in Yosemite National Park (Bennett 1955, 39, 41). However, our Type 5 specimens are longer and narrower than the triangular specimens recorded by Bennett (Type 52, Fig. 4; Type 64, Fig. 24, 1; Table 17).

Type 5 is represented in Mono County and in the General Store (Mather 1955, Type 1, Fig. 2, Pl. 3, Nos. 2-4, Table 3). Comparable specimens appeared in the Southwest just before the arrival of pottery and then persisted (Hartman 1950, 273, Fig. 50e).

### Type 6 Points

Large heavy shouldered or ranged points with tapered stems. A total of 3 specimens: levels III (13-18") and IV (8-12"), Fig. 1, Pl. 3.

Comparable points were obtained from deeper levels of excavated sites in Yosemite National Park (Bennett 1955, Type 610, Fig. 10, Type 614, Fig. 61). The type occurs in Mono County and the General Store (Mather 1955, Type 7, Fig. 2, Table 3). Type 6 specimens bear a general resemblance to Gypsum Cave points excavated from the lower levels of Gypsum Cave, Nevada and found on the shores of dry lakes in the Mohave Desert, California (Hartman 1953, Figs. 19, 24).

The heavy tapered-stem point may have had a long and continuous history. It is my opinion that while in some regions it gave way entirely to the wide-notched dart-point, considered in the Southwest to be typical of Basketmaker culture, in other places it lasted until the introduction of the bow-and-arrow rendered darts and dart-point obsolete. (Hartman 1953, 119).

### KNIVES

A total of 8 artifacts classifiable as knives were recovered from the Mammoth Creek site. A specimen from Level V (0-8") 1 from Level IV (8-12") 1 from Level III (13-18") 1 from the surface near the inner cave entrance; and 1 from the surface of the rock-rim 50 yards Southwest of the Cave (Pl. 4).

All are obsidian, blintedly flaked with rounded edges, but vary considerably in size, shape, and workmanship. Two are heavily pitted. Length range is 3.3 to 11.5 cm., width range is 2.2 to 5.2 cm., thickness varies from 0.3 to 2.2 cm., weight varies from less than 2 gms. to 9.55 gms.



### Small knives

EA-40 Delicately flaked knife of brown obsidian, probably side-hafted. The hafted side and one end is broken. Thickness 0.3 cm.; weight 1.1 gms.; Level III.

EA-37 Carefully worked, convex-sided triangular knife of black obsidian which may have been hafted. Length 3.3 cm.; width 2.9 cm.; thickness 0.5 cm.; weight 4.0 gms. Level V. (Plate 4Ac).

EA-35 Base and mid-section of slender, straight-based triangular knife of banded black and gray obsidian. Flaking is somewhat irregular but the base and sides are well thinned and sharpened. Width 2.2 cm.; thickness 0.5 cm.; Level V.

### Medium-sized knives

EA-38 Knife tip of black obsidian with irregular ribbon-like flaking. The edges are sharpened by secondary retouching. Thickness 0.6 cm. Level V (Plate 4Ac).

EA-39 Knife tip of dark-gray silver sheen obsidian with shallow flaking and thinned cutting edges. Thickness 1.0 cm. Level IV. (Plate 4Ad)

### Large knives

EA-42 Well made knife of fine quality black obsidian is shaped as a slender oblong with rounded ends. The edges are sharpened by the removal of tiny flakes. Length 7.0 cm.; width 3.1 cm.; thickness 1.4 cm.; weight 26 gms. Surface of rock-ring.

EA-36 Heavily patinated ovoid knife-like tool of black obsidian. Large percussion flaked scars cover both surfaces. The edges are lightly retouched. Length 11.5 cm.; width 4.4 cm.; thickness 2.2 cm.; weight 90.0 gms. Level V. (Plate 4Aa)

EA-41 Heavily patinated ovoid knife-like tool similar in workmanship to EA-36. Material black obsidian; length 10.1 cm.; width 5.2 cm.; thickness 1.7 cm.; weight 95.5 gms. Surface. (Plate 4Ab).

### SCRAPERS

A total of 16 flake scrapers were recovered from Mammoth Creek Cave 1 from the surface; 4 from Level V (0-6"); 7 from Level IV (6-12"); 3 from Level III (12-18"); 1 from Level II (between 20 and 24"). All are made of obsidian. The largest measures 5.9 cm. by 3.3 cm., with a maximum thickness of 0.6 cm. The smallest is 2.6 cm. by 2 cm., with a maximum thickness of 0.5 cm. (Pls. 4B, 5Adaf, 6Ab).



Small knives

EA-40 Delicately flaked knife of brown obsidian, pre-  
baked side-baked. The flaked side and one end is broken. Thick-  
ness 0.3 cm. weight 1.1 gms. Level III.

EA-37 Carefully worked, convex-sided triangular knife of  
black obsidian which may have been flaked. Length 3 cm. width  
2.9 cm. thickness 0.3 cm. weight 4.0 gms. Level V. (Plate 4a).

EA-35 Base and side-section of slender, straight-sided  
triangular knife of banded black and gray obsidian. Flaking is  
somewhat irregular but the base and sides are well chipped and  
sharpened. Width 3.2 cm. thickness 0.3 cm. Level V.

Medium-sized knives

EA-36 Knife tip of black obsidian with irregular ribbon-  
like flaking. The edges are sharpened by secondary retouching.  
Thickness 0.5 cm. Level V (Plate 4a).

EA-38 Knife tip of dark-gray silver sheen obsidian with  
shallow flaking and thinned cutting edges. Thickness 1.8 cm.  
Level IV. (Plate 4 ab)

Large knives

EA-32 Well made knife of fine quality black obsidian is  
shaped as a slender oblong with rounded ends. The edges are  
sharpened by the removal of tiny flakes. Length 7.0 cm. width  
3.1 cm. thickness 1.1 cm. weight 28 gms. Surface of rock-ring.

EA-33 Heavily patinated oval knife-like tool of black  
obsidian. Large perforation flaked scars cover both surfaces.  
The edges are slightly recessed. Length 11.5 cm. width 4.4 cm.  
thickness 2.2 cm. weight 90.0 gms. Level V. (Plate 4a)

EA-41 Heavily patinated oval knife-like tool similar in  
workmanship to EA-33. Material black obsidian; length 10.1 cm.  
width 5.2 cm. thickness 1.7 cm. weight 95.5 gms. Surface.  
(Plate 4 ab).

CHAPTER

A total of 10 flake artifacts were recovered from Mammoth  
Cave. 1 from the surface; 4 from Level V (0-5") 7 from  
Level IV (5-12") 3 from Level III (12-18") 1 from Level II (18-  
25 and 24"). All are made of obsidian. The largest measures  
2.9 cm. by 3.3 cm. with a maximum thickness of 0.5 cm. The  
smallest is 2.8 cm. by 2 cm. with a maximum thickness of 0.3 cm.  
(Pls. 4b, 5ab, 6ab).



2 scrapers fashioned on thin, curved flakes are well made triangular side and end scrapers with one end pointed. Each is completely flaked on the convex surface and bifacially retouched along the entire margin. (Level V.)

4 scrapers are made on thick flakes roughly oval in outline with bifacial retouching on one or more edges. 3 convex side scrapers. 1 convex-concave side and end scraper. (Levels V, IV).

10 scrapers are made on thin flakes with minimal retouching on the working edges. 1 side scraper with parallel working edges (Level V). 1 side scraper with 1 straight and 1 concave edge. (Level III). 1 straight edged side scraper (surface). 2 convex-concave side scrapers with one end pointed (Level IV). 3 convex-concave side scrapers (Levels V, III, II). 2 heavily patinated side scrapers (Levels IV, III).

Unspecialized flake scrapers ranged throughout the cultural deposits and constituted about one-quarter of the chipped stone assemblage. No doubt all but the 2 triangular specimens were hastily made to serve various temporary needs. This group seems to have little diagnostic value other than to point to the dressing of skins, processing of plant fibers, and possible manufacture of wooden objects by the Cave's inhabitants.

Flake scrapers represent more than half of the chipped stone specimens from Yosemite National Park and are most abundant in sites of the Mariposa Complex which represents the protohistoric sequence (Dennyhoff 1956 30). Flake scrapers are abundant in Mono County (Reighan 1955 16) and Vermillion Valley (Lathrup and Schutler 1955 235-7), and comparatively infrequent at Iny-2 in Owens Valley (Siddell 1951 18).

#### PERFORATORS

3 perforators were recovered from Mammoth Creek Cave deposits. 1 specimen from Level V (0-6"). 2 from Level IV (6-12"). (Pl 5abc).

EA-59 A large heavy convex-edged and pointed tool, made of black obsidian, seems to have been reworked from a larger implement. It measures 11.1 cm in length by 8.8 cm. in width and has a maximum thickness of 2.7 cm. Its weight is 150.0 gms. Level V. (Plate 5Aa).

EA-64 A tool possibly used as a punch is made on a thick obsidian flake. One end is worked to a stubby point. It measures 4.8 cm. by 4.7 cm. and is 2.2 cm. in maximum thickness. Weight is 23.0 gms. Level IV. (Plate 5Ab).



2 scrapers fashioned on thin, curved flakes are well made triangular side and end scrapers with one end pointed. Each is completely flaked on the convex surface and bilaterally retouched along the entire margin. (Level V.)

4 scrapers are made on thick flakes roughly oval in outline with bilateral retouching on one or more edges. 3 convex side scrapers 1 convex-concave side and end scraper. (Levels V, IV.)

10 scrapers are made on thin flakes with minimal retouching on the working edges. 1 side scraper with parallel working edges (Level V) 1 side scraper with 1 straight and 1 concave edge (Level III) 1 straight edged side scraper (Level IV) 3 convex-concave side scrapers with one end pointed (Level IV) 3 convex-concave side scrapers (Levels V, III, II) 2 heavily pointed side scrapers (Levels IV, III).

Unquestioned flake scrapers ranged throughout the cultural deposits and considered about one-quarter of the chipped stone assemblage. No doubt all but the 2 triangular specimens were hastily made to serve various temporary needs. This group seems to have little diagnostic value other than to point to the dressing of skins, processing of plant fibers, and possible manufacture of wooden objects by the Cave's inhabitants.

Flake scrapers represented more than half of the chipped stone specimens from Locusts National Park and are abundant in sites of the Harpoot Complex which represent the prehistoric sequence (Bennett 1955:30). Flake scrapers are abundant in Bone County (Meltzer 1955:18) and Verillion Valley (Leshy and Schuster 1955:25-7), and comparatively infrequent at Jay-2 in Owen Valley (Bennett 1955:18).

# PERFORATORS

3 perforators were recovered from Mammoth Creek Cave deposits. 1 specimen from Level V (0-4) 2 from Level IV (0-12). (Pl. 3abc).

Ma-39 a large heavy convex-edged and pointed tool, made of black obsidian, seems to have been retouched from a larger implement. It measures 11.1 cm in length by 8.6 cm in width and has a maximum thickness of 2.7 cm. Its weight is 150.0 gms. (Plate 3aa).

Ma-40 a tool possibly used as a punch is made on a chert obsidian flake. One end is worked to a sharp point. It measures 8.8 cm by 4.7 cm and is 2.8 cm in maximum thickness. Weight is 25.0 gms. (Plate 3ab).



EA-61 A small pointed tool made on a flake of heavily patinated black obsidian is 3.4 cm. in length, 1.8 cm. in width and 0.5 cm. in maximum thickness. It weighs 1.5 gms. Level IV. (Plate 5Ac).

#### SHELL BEADS

A total of 2 shell beads were excavated from Mammoth Creek Cave Level III (12-18"), (Fig. 2, Pl. 5c).

Shell bead type numbers used herein are those of Bennyhoff and Heizer's Shell Bead Typology (1958 Fig. 1).

Heliotis Bead Type 1 square, single (central) perforation average size (No. 65)

A total of 1 complete, well preserved specimen size 6 mm x 10 mm diameter of perforation 1.2 mm.

Heliotis square beads (Type 1) occur in a roughly contemporaneous shell bead complex at the following sites: Early-Transitional occupation levels of Lovelock Cave, Nevada, Ch-18; Karlo Site, Las-7 where the type probably represents the Early Lovelock period; Berkeley facies of Central California thought to date from about 1500 B.C. to 500 B.C. This bead type is not known to persist into later cultural phases and appears to reflect a widespread temporal horizon (Bennyhoff and Heizer 1958 63-4).

Olivella Bead Type 3d small disk bead (No. 36)

A total of 1 specimen: diameter 4 mm; inside diameter 1.2 mm.

Olivella small disk beads (Type 3d) were recovered from the Type Site for the historic and proto-historic Owens Valley Paiute, Iay-2, and from Tommy Tucker Cave, Las-1. The type lacks specific temporal significance since it was used throughout Middle and Late times in Central California and for a long time period in Southern California (Bennyhoff and Heizer 1958 67, Table 3).

#### BONE BEADS

A total of 2 bone beads were excavated from Mammoth Creek Cave, 1 each from Levels V (0-6") and IV (6-12"), (Fig. 2, Pl. 6 AB).

Mammal-bone Beads: ring-shaped, smoothed and polished, with drilled conical perforations. Size diameter variable, 3.5 mm and 3.9 mm; inside diameter (each) 1 mm.



Level IV (Type 3a)  
 A small pointed tool made on a flake of heavily  
 pitted black obsidian is 3.4 cm. in length, 1.5 cm. in  
 width and 0.5 cm. in maximum thickness. It weighs 1.5 gms.

## SHELL BEADS

A total of 3 shell beads were excavated from Mammoth  
 Creek Cave, Level III (11-12'). (Fig. 2, Pl. 2a)

Shell bead type numbers and certain are those of Bandyhoff  
 and Nelson's Shell Bead Typology (1958 Pl. 11)

Helicella (Type 1) sp., single (central) perforation  
 average size (No. 32)

A total of 1 complete, well preserved specimen, size 3 mm x  
 10 mm diameter of perforation 1.2 mm.

Helicella sp. beads (Type 1) occur in a roughly conical  
 formation shell beads complex at the following sites: Kari-  
 transitional occupation levels of Lovelock Cave, Nevada, 10-12  
 Kari site, Las Vegas where the type probably represents the early  
 Lovelock period. Bandyhoff's factor of Central California changes  
 to date from about 1500 B.C. to 500 A.D. This bead type is not  
 known to perforate into later cultural phases and appears to be  
 from a widespread temporal horizon (Bandyhoff and Nelson 1958  
 Pl. 11).

Helicella (Type 3a) small disk bead (No. 36)

A total of 1 specimen, diameter 4 mm, inside diameter 1.2 mm.

Helicella small disk beads (Type 3a) were recovered from the  
 Type III site for the historic and proto-historic Great Valley Locals,  
 11-12, and from the historic Cave, Las Vegas. The type is  
 specific temporal significance since it was used throughout  
 middle and late times in Central California and for a long time  
 period in Northern California (Bandyhoff and Nelson 1958 Pl.  
 Table 1).

## SHELL BEADS

A total of 3 beads were excavated from Mammoth Creek  
 Cave, 1 each from levels 7 (10-11'), and IV (11-12'). (Fig. 2, Pl. 2a)

Small-disk beads, ring-shaped, smoothed and polished, with  
 drilled central perforations. Size diameter variable, 3-5 mm  
 and 3-5 mm inside diameter (each) 1 mm.



## GLASS BEADS

A total of 27 glass beads were excavated from Mammoth Creek Cave: 16 from level V (0-6"); 5 from Level IV (6-12"); 4 from Level III (12-18"). (Fig. 2; Pl. 6)

### Type 1

Cylindrical red opaque glass bead with transparent green centers. Size variable: length 4.5 mm; diameter 3.5 mm to 8 mm; inside diameter 2 mm to 3.5 mm. A total of 6 beads: 4 from level V, 2 from level III.

### Type 2

Sub-spherical red opaque glass bead with pinkish-white center. Length 4.5 mm; diameter 6 mm; inside diameter 1.5 mm. A total of 1 bead: level V.

### Type 3

Torus-shaped red translucent glass bead with yellow center. Length (each) 4 mm; diameter (each) 8 mm; inside diameters 3 mm and 2.5 mm. A total of 2 beads: 1 each in levels V and IV.

### Type 4

Cylindrical white opaque glass bead. Size variable: length 4 mm to 7 mm; diameter 6 mm to 8 mm; inside diameter 1.5 mm to 3 mm. A total of 16 beads: 12 from level V; 4 from level IV; 2 from level III.

## Discussion

Types 1, 2 and 3 are so-called "Coeur d'Aleppo" beads made and used from the 16th century to modern times. Type 4 occurs in over 30 sites of varying ages in California. While these beads lack chronological significance, California sites occupied after A. D. 1850 usually contain additional bead types characteristic of this later historic period. Their apparent absence in Mammoth Creek Cave suggests its possible abandonment by the mid-nineteenth century (Personal communication Clement W. Meighan).

## POTTERY

A total of 13 potsherds ranging in length and width from 3.6 mm x 3.6 mm, to 1.8 mm x 1 mm, were excavated from Mammoth Creek Cave: 9 sherds including 2 rim sections from level V (0-6"); 4 sherds from level IV (6-12"). (Fig. 2; Pl. 7A, B)



## GLASS BEADS

A total of 37 glass beads were excavated from Mammoth Creek Cave. 18 from level V (0-5"), 2 from level IV (5-12") and 17 from level III (12-18"). (Fig. 2, Pl. 5)

### Type 1

Cylindrical red opaque glass bead with transparent green center. Size variable. Length 4.5 mm; diameter 3.5 mm to 8 mm; inside diameter 3 mm to 3.5 mm. A total of 6 beads from level V, 2 from level III.

### Type 2

Sub-spherical red opaque glass bead with pinkish-white center. Length 4.5 mm; diameter 5 mm; inside diameter 1.5 mm. A total of 1 bead from level V.

### Type 3

Torus-shaped red transparent glass bead with yellow center. Length (each) 4 mm; diameter (each) 8 mm; inside diameter 3 mm and 3.5 mm. A total of 2 beads from levels V and IV.

### Type 4

Cylindrical white opaque glass bead. Size variable. Length 4 mm to 7 mm; diameter 5 mm to 8 mm; inside diameter 1.5 mm to 3 mm. A total of 18 beads from level V, 4 from level IV, 2 from level III.

## Discussion

Types 1, 2 and 3 are so-called "bead-shaped" beads made and used from the late century to modern times. Type 4 occurs in over 30 sites of varying ages in California. While these beads lack chronological significance, California sites occupied after A. D. 1850 usually contain additional bead types characteristic of this later historic period. Their appearance in Mammoth Creek Cave suggests the possible abandonment by the mid-nineteenth century (personal communication, Clarence W. Meighan).

## POTTERY

A total of 13 potsherds ranging in length and width from 1.8 mm x 3.8 mm to 1.8 mm x 1 mm, were excavated from Mammoth Creek Cave. 9 sherds including 2 rim sections from level V (0-5") and 4 sherds from level IV (5-12"). (Fig. 3, Pl. 5, 6)



## Description

Construction: coiling with thinning by scraping.

Surface finish: rough to fairly smooth with perceptible mica flakes and quartz grains. Parallel striations are visible on the exterior surfaces of 4 sherds.

Surface color: exteriors range from brown to gray or black; interiors from gray to black. Carbonized food adheres to rim sherd interiors.

Core color: brown exterior and gray to black interior on 4 sherds; all others gray to black.

Core texture: variable, grading from rather coarse to medium fine.

Temper: fine to moderately coarse quartz sand with numerous mica flakes.

Thickness: uneven, ranging from 4.5 mm to 7 mm.

Rim: thickness varies from 4 mm to 6 mm; slightly incurving; horizontal curvature measurements suggest a vessel diameter of 23 cm. to 25 cm.

## Discussion

Type: The pottery from Mammoth Creek Cave corresponds to the type known as Owens Valley Brown Ware described from the Type Site for the historic and proto-historic Owens Valley Paiute, Site Iny-2, and is within the known geographic range of that type (Riddell 1951: 20-3).

Owens Valley Brown Ware occurs ethnographically and archaeologically throughout Owens Valley (Steward 1933: 266-9; Riddell and Riddell 1956: 28-9). Pottery of similar manufacture, considered by Riddell (1951: 22) to be Owens Valley Brown Ware, was made by the ethnographic Western Mono and their Yokuts neighbors (Steward 1933: 269; Barrett and Gifford 1933: 211; Riddell 1951: 22; Riddell and Riddell 1956: 29).

## METATES AND MANOS

### Metates

A large lava boulder at the Cave entrance was evidently used as a convenient metate. It displays a smoothed level grinding surface.



## Description

Construction: colling with shinning by scraping.

Surface finish: rough to fairly smooth with perceptible side flaking and quartz grains. Partial striations are visible on the exterior surfaces of 4 shanks.

Surface color: exterior range from brown to gray or black, interior from gray to black. Carbonized food adheres to the shank interiors.

Core color: brown exterior and gray to black interior on 4 shanks. All others gray to black.

Core texture: variable, grading from rather coarse to medium fine.

Temper: fine to moderately coarse grained sand with numerous small flakes.

Thickness: uneven, ranging from 4.5 mm to 7 mm.

Size: thickness varies from 4 mm to 5 mm, slightly increasing. Horizontal curvature measurements suggest a venous diameter of 25 cm to 35 cm.

## Discussion

Type: The pottery from Kenneth Creek Cave corresponds to the type known as Green Valley Brown Ware described from the type site for the historic and prehistoric Owens Valley culture, size 10-12, and is within the known geographic range of that type (Riddell 1951: 20-21).

Green Valley Brown Ware occurs ethnographically and archaeologically throughout Owens Valley (Steward 1933: 100-2; Riddell and Riddell 1950: 28-9). Recovery of similar manufactures, considered by Riddell (1951: 22) to be Green Valley Brown Ware, was made by the ethnographic Steward team and their Owens Valley (Steward 1933: 100-2; Riddell and Riddell 1950: 28-9) and Riddell (1951: 22).

## NOTES AND REFERENCES

### References

A large lava boulder up the cave entrance was evidently used as a convenient terrace. It displays a smoothed level grinding surface.



EA-79 An asymmetric unifaced, slab metate of metamorphic rock measuring 35.0 cm. by 21.0 cm. was recovered in Level III of the Cave deposits. The grinding surface is very lightly concave. (Plate 8c).

#### MANOS

EA-67 A small, asymmetric, unifaced cobble mano of vesicular igneous rock was recovered in Level III in close proximity to the slab metate (EA-79). (Plate 8Bb)

EA-66 A leaf-shaped unifaced mano of dense igneous rock occurred at a depth of 8 inches in Level IV. (Plate 8Ba)

EA-69a Mano fragment of coarse-grained granitic rock, Level IV.

EA-69b Mano fragment of metamorphic rock. Level IV.

Manos were used with bedrock metates at Pre-115 in Vermilion Valley (Lathrup and Schutler 1955:236); with bedrock metates and slab metates at Inye-2 in Owens Valley (Riddell 1951). Manos occur with bedrock metates and slab metates in Mono County (Weighan 1955:12-3), and in Owens Valley (Riddell and Riddell 1956:31). The mano and slab metate are diagnostic traits of the Crane Flat Complex (Site Mhp-105), the earliest cultural complex defined by Bennyhoff (1956) in Yosemite National Park.

#### BONE

##### Modified Bone

A small rectangular bone fragment (EA-65c) polished on 1 face and incised with 2 parallel lines was recovered from Level III. (Pl. 5Bc)

2 ring-shaped mammal bone beads (EA-33a, b) recovered from Levels V and IV are described in the section on beads. (Fig. 2; Pl. 6A, B)

#### FOOD BONES

Unworked animal bones ranged abundantly throughout the cultural deposits of Mammoth Creek Cave. The great majority are fragmented and often charred, suggesting their utilization as food bones. There is little doubt that certain of these bones were intentionally cut and split to obtain the marrow. (Pl. 5C)



8A-70 an agyretic unlined, slab waste of metamorphic rock containing 15.0 gr. by 21.0 cm. was recovered in level III of the Cave deposits. The grinding surface is very highly concave. (Plate 6a).

## 8A-70

8A-71 a small, agyretic, unlined waste of metamorphic rock was recovered in level III in close proximity to the slab waste (8A-70). (Plate 6a)

8A-66 a leaf-shaped unlined waste of dense igneous rock occurred at a depth of 8 inches in level IV. (Plate 6a)

8A-69a large fragment of coarse-grained granitic rock, level IV.

8A-69b large fragment of metamorphic rock, level IV.

8A-69c were used with bedrock wastes at 71-115 in Vermilion Valley (Leshing and Schuler 1955 236) with bedrock wastes and slab wastes at 145-2 in Owen Valley (Middell 1951). 8A-69d were used with bedrock wastes and slab wastes in Owen Valley (Middell 1951 12-13), and in Owen Valley (Middell and Middell 1952 11). The waste and slab waste are diagnostic traits of the Owen Line Complex (1951 102), the earliest natural complex defined by Hargraves (1950) in Yosemite National Park.

## 8A-69

### Modified Bone

A small rectangular bone fragment (8A-69e) polished on 1 face and incised with 2 parallel lines was recovered from level III. (PL. 6a)

A ring-shaped natural bone bone (8A-69f, b) recovered from levels V and IV are described in the section on beads. (PL. 6, PL. 6a, b)

## FOOD BONES

Unworked animal bones ranged abundantly throughout the natural deposits of Kenneth Creek Cave. The great majority are fragmented and often charred, suggesting their utilization as food bones. There is little doubt that certain of these bones were intentionally cut and split to obtain the marrow. (PL. 6c)



The list of specimens capable of identification consists of the bones and/or teeth of Rodentia - small rodents and the larger marmot (Marmota); Ungulata, specifically deer (Odocoileus) and bighorn sheep (Ovis); and Canid - possibly coyote - represented by a single tooth. (Pl. 5 Bd, e)

Most numerous are the bones and teeth of deer and bighorn sheep. It seems reasonable to assume that these large mammals, native to the Sierra Nevada (Storer and Usinger 1963 355-6) were an important food source for the Cave's inhabitants.

### PICTOGRAPHS

A small group of pictograph designs consisting of circles, dots and parallel lines painted in white are superimposed on the soot-covered north wall of the Cave. The largest design is a spoked circle 12.0 cm. in diameter and 4 feet above floor level. (Plate 7C) Similar designs in white on the north ceiling are partially obscured by smoke.

The design elements correspond to Heizer and Baughoff's (1962 237; Fig. 31b) Great Basin Painted Style, "characterized by circles and parallel lines done in red and white mineral pigment. Its original distribution was presumably wider than attested at present if our assumption is true that painted designs have been obscured by smoke on cave walls or have been weathered away in exposed positions." Heizer and Baughoff conclude that Great Basin Painted style must be recent in origin and suggest A.D. 1000 as the earliest beginning date (1962 234; Table 9).

Great Basin Painted style pictographs are recorded from Western Nevada at Whiskey Flat, MI-5; Gabbs, MI-3; and in the Silver Peak Range east of Fish Lake Valley, Esmeralda County (Heizer and Baughoff 1962 36; Pl. 13c; Fig. 107e-g). Similar pictographs were noted by Steward (1933 334-5) in Deep Springs Valley and on the Volcanic Tableland overlooking the Owens River just north of Bishop in Eastern California.

Six Great Basin Painted style pictograph sites occur in Yosemite National Park in association with, or near, historic villages. Bennyhoff (1956 21-2) is of the opinion that these fairly well-preserved designs date from a relatively late period, that their shared similarity with pictographs in the eastern Sierra region demonstrates close contact between the Miwok and Paiute as recorded by the ethnographic data.

### Red and White Pigment

According to Owens Valley Paiute informants white paint was derived from chalk gathered in Owens Valley near Fish Springs dam at the eastern end of the Poverty Hills; red paint from cinnabar deposits in the Last Chance Mountains bordering Death Valley (Steward 1933 276-7).



The list of specimens capable of identification consists of the bones and/or teeth of rodents - small rodents and the larger mammals (Mammalia), Ungulates, especially deer (Cervidae) and bighorn sheep (Ovis) and cattle - possibly coyotes - represented by a single tooth. (Pl. 2, 3, 4, 5)

Most mammals are the bones and teeth of deer and bighorn sheep. It seems reasonable to assume that these large mammals native to the Sierra Nevada (Storer and Gidycz 1953: 25-26) were an important food source for the Cave's inhabitants.

### PICTOGRAPHS

A small group of pictograph designs consisting of circles, dots and parallel lines painted in white are superimposed on the rock-covered north wall of the Cave. The largest design is a speckled circle 12.0 cm. in diameter and 1 foot above floor level. (Plate 7C) Similar designs in white on the north ceiling are partially obscured by smoke.

The design elements correspond to Helmer and Barnholt's (1953: 207, Pl. 21) Great Basin Painted Style. The characteristic by circles and parallel lines done in red and white mineral pigments. The original distribution was presumably wider than at present. It is assumed that the designs are first painted designs have been obscured by smoke on cave walls or have been weathered away in exposed positions. Helmer and Barnholt conclude that Great Basin Painted style must be recent in origin and suggest A.D. 1800 as the earliest beginning date (1953: 23A, Table 2).

Great Basin Painted style pictographs are recorded from Western Nevada at Whitey Pass, NV-2, Gadsby, NV-3, and in the Silver Lake Range east of Fish Lake Valley, Nevada (Gidycz 1953: 21, Pl. 13). Helmer and Barnholt (1953: 23A-2) in Deep Springs pictographs were noted by Steward (1933: 23A-2) in Deep Springs Valley and on the Volcanic Tableland overlooking the Owens River just north of Bishop in Eastern California.

Six Great Basin Painted style pictograph sites occur in Yosemite National Park in association with, or near, historic villages. Barnholt (1953: 21-2) is of the opinion that these fairly well-preserved designs date from a relatively late period, that they shared similarity with pictographs in the eastern Sierra region demonstrates close contact between the Mono and Inyo as recorded by the ethnographic data.

### Red and White Paintings

According to Owens Valley Paints information white paint was derived from chalk gathered in Owens Valley near Fish Springs dam at the eastern end of the Poverty Hills; red paint from ochreous deposits in the Last Chance Mountains bordering Deep Valley (Steward 1933: 23A-2).



The Central Miwok of the Yosemite region made white paint from chalk obtained from the bottom of springs at Springfield. They received red paint, a mineral pigment, in trade from the Eastern Mono (Barrett and Gifford, 1933 224-5).

### MISCELLANEOUS ITEMS

#### Steatite

One convex-concave sherd of gray steatite was collected from the surface of the Cave. The sherd, 1.2 cm. in thickness, crudely worked and smoothed, seems to be a fragment of a steatite bowl or pot.

Steatite sherds and vessels were found by Bennyhoff (1956 52) in Yosemite National Park. Steatite vessels were used for cooking and for general receptacles by the ethnographic Miwok of the Yosemite region (Barrett and Gifford, 1933 211).

Two steatite vessels are known from the Mammoth area, a pot recorded by Steward (1933 285), and a beautifully made steatite bowl found near Hot Creek 3 miles east by north from Mammoth Creek Cave, and now in the possession of Mrs. Sybil Summers Coleman of Bishop, California.

Contemporaneous use of steatite and pottery vessels on the latest sites in Owens Valley is evidenced by surface collections made by Mr. and Mrs. Harry Riddell. "The absence of pottery from some sites at which steatite vessels occur is of interest because it suggests to us a possible earlier use of steatite vessels, and a continuation of their use after the introduction of pottery" (Riddell and Riddell 1956 28-9).

#### Hammerstone

EA-71 A small, cone-shaped hammerstone which shows considerable battering came from Level V. (Plate 8Bc)

#### Workshop Material

Obsidian flaking debris was abundant in Levels V, IV and III of the cave deposits. Black opaque obsidian was most commonly used but occasional flakes of grey, red, brown, transparent and banded obsidian, and one flake of white chalcedony were recovered. Several flakes are heavily patinated. (Plate 8Ab)



The Central block of the Yosemite region made white point from chain obtained from the bottom of spring at Springfield. They received red point, a mineral pigment, in trade from the Western Home (Barrett and Gifford, 1933, 124-5).

## KIDNEYSTONE FORM

### Basaltic

One convex-convex shape of grey basaltic was collected from the surface of the cave. The shape, 1.5 cm. in diameter, originally worked and smoothed, seems to be a fragment of a basaltic bowl or pot.

Basaltic shards and vessels were found by Kennedy (1935, 52) in Yosemite National Park. Basaltic vessels were used for cooking and for general purposes by the aboriginal Indians of the Yosemite region (Barrett and Gifford, 1933, 121).

Two basaltic vessels are known from the Mammoth area, one recorded by Howard (1935, 183), and a basaltic bowl recorded by Howard near Hot Creek 3 miles east by north from Mammoth Creek Cave, and now in the possession of Mr. Lyell, University of Chicago, California.

Conspicuous use of basaltic and pottery vessels in the latest stage in Great Valley is evidenced by various indications made by Mr. and Mrs. Harry Kibbell. The shapes of pottery from some sites at which basaltic vessels occur is of interest because it suggests to us a possible earlier use of basaltic vessels, and a continuation of their use after the introduction of pottery (Kibbell and Kibbell 1935, 18-9).

### Basaltic

54-71 A small, cone-shaped basaltic vessel which shows considerable basaltic came from Level V. (Plate 82c)

### Workshop material

Obsidian flaking debris was abundant in levels V, IV and III of the cave deposits. Black opaque obsidian was most commonly used but occasional flakes of grey, red, brown, translucent and banded obsidian, and one flake of white chalcedony were recovered. Several flakes are heavily perforated. (Plate 82d)



## INFERENCES

### LIFEWAY

The basic lifeway to be inferred from the Mammoth Creek Cave cultural assemblage is one of economic dependence upon hunting and gathering. Projectile points, mammal bones and cutting, scraping and perforating tools that could have served for the processing of skins, strongly indicate that the subsistence pattern depended in part on the taking of game. Similarly, the gathering of wild vegetal foods is implied by the presence of metates and manos, grinding implements traditionally used in the preparation of meal from seeds and nuts.

Heavy carbon deposit on walls and ceiling, plus accumulations of charcoal and ash, cut and charred animal bone, and fire-cracked pebbles suitable for stone-boiling in skins or baskets, suggest that meals were sometimes cooked and eaten in the warmth and shelter of the Cave. Sherds of steatite and pottery, including two vessel-rim sherds with carbonized crusts still adhering to the inner surface, represent vessels which may have served equally well as containers for food, or as cooking pots.

Excellent craftsmanship is frequently exhibited in the flaking of obsidian points, and the shaping, polishing and drilling of bone. Obsidian, obtainable at nearby quarries, was a favored material for weapon points and tools.

Incising on bone; painted pictograph designs; and shell, bone and glass beads show that some attention was given to artistic expression and personal adornment.

Marine-shell beads denote contact, perhaps through inter-regional trade, with distant coastal peoples. Glass beads are time markers in the sense that occupancy of the Cave probably lasted well into the historic period.

The absence of discernable occupational levels within the cultural deposits may be indicative of a rather consistent pattern of intermittent, temporary use. No doubt repeated visits to the Cave were largely dependant upon seasonal movements of individuals and small family groups in search of game, ripening seeds, and various vegetal and animal products which sustained the hunting-gathering economy.



The basic lifestyle to be inferred from the Mammoth Cave Grotto is one of economic dependence upon hunting and gathering. Projectile points, mammal bones and cutting, scraping and perforating tools that could have served for the processing of skins, strongly indicate that the subsistence pattern depended in part on the taking of game. Finally, the gathering of wild vegetable foods is implied by the presence of mollusks and bones, grinding implements traditionally used in the preparation of meal from seeds and nuts.

Heavy carbon deposits on walls and ceiling, plus accumulations of charcoal and ash, cut and charred animal bones, and fire-cracked pebbles suitable for stone-boiling in skins or baskets, suggest that meals were sometimes cooked and eaten in the warmth and shelter of the Grotto. Shards of steatite and pottery, including two vessel-rim sherds with carbonized crusts still adhering to the inner surface, represent vessels which may have served equally well as containers for food, or as cooking pots.

Excellent craftsmanship is frequently exhibited in the flaking of chert points, and the shaping, polishing and grinding of bone. Obsidian, obtainable at nearby quarries, was a favored material for weapon points and tools.

Inlaid on bone; painted pictograph designs; and shell, bone and glass beads show that some attention was given to artistic expression and personal adornment.

Marine-shell beads denote contact, perhaps through inter-regional trade, with distant coastal peoples. Glass beads are time markers in the sense that occupancy of the cave probably lasted well into the historic period.

The absence of discernible occupational levels within the cultural deposits may be indicative of a rather consistent pattern of intermittent, temporary use. No doubt repeated visits to the cave were largely dependent upon seasonal movements of individuals and small family groups in search of game, ripening seeds, and various vegetable and animal products which sustained the hunting-gathering economy.



# TYPOLOGICAL TRAIT COMPARISONS

Table 1

| Typological Traits                                                 | Mammoth Creek Cave                      | Yosemite National Park      | Owens Valley Site Iny-2 | Vermillion Valley Site Fe-115 |
|--------------------------------------------------------------------|-----------------------------------------|-----------------------------|-------------------------|-------------------------------|
|                                                                    | Owens Valley Paiute<br>Mono Lake Paiute | Southern and Central Minnek | Owens Valley Paiute     | Western Mono                  |
| Small Proj. Points:<br>DB-n, triangular,<br>tanged, expanding stem | X                                       | X                           | X                       | X                             |
| Steatite Vessels                                                   | X                                       | X                           | X                       | X                             |
| Flake Scrapers                                                     | X                                       | X                           | X                       | X                             |
| Metates, Manos                                                     | X                                       | X                           | X                       | X                             |
| Owens Valley<br>Brown Ware Pottery                                 | X                                       |                             | X                       | X                             |
| Large Proj. Points                                                 |                                         |                             |                         |                               |
| Tanged, expanding stem                                             | X                                       | X                           | X                       |                               |
| Large Proj. Points                                                 |                                         |                             |                         |                               |
| Triangular, tanged stem                                            | X                                       | X                           |                         |                               |
| Pictographs                                                        | X                                       | X                           |                         |                               |

There is strong typological correspondence between the Mammoth Creek Cave cultural materials and those previously designated sites in Yosemite, Vermillion Valley and Owens Valley, especially in regard to traits associated with the protohistoric - historic occupational sequence. The historic and ethno-historic records document the close cultural and kinship affiliations existing between the Southern and Central Minnek, Mono Lake Paiute, Western Mono, and Owens Valley Paiute, thus confirming the archeological evidence.

Since the Cave is situated within the territorial boundaries of the Mono Lake Paiute and in territory visited by Owens Valley Paiute, it is now possible to state that Mammoth Creek Cave was used, at least occasionally, by either or both of these groups and by their immediate ancestors, presumably while hunting or foraging. According to Steward (1933:238-9), the Owens Valley Paiute "...kept headquarters in valley villages, fishing, seed gathering in the valley or hills... or making trips north in small family groups for piñon... Pinonut expeditions wintered in the mountains in the timber when crops were good... Hunting occurred at all seasons. . . Seasonal movements were within an average radius from the valley village of 15 or 20 miles...."





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 were within an average radius from the valley village of 15 or  
 20 miles...."



Was this cave sometimes used as a wayside stop on the Mammoth Creek-Mammoth Pass trans-Sierra trade route? It well could have been. In the first place it is strategically and conveniently located for use by trans-Sierra travelers. Secondly, Mammoth Creek Cave shares Owens Valley Brown Ware pottery with Owens Valley to the south and Vermillion Valley to the west. Great Basin Painted pictographs with Yosemite to the north, and Nevada and Eastern California sites to the east, recorded by Heizer and Baumhoff (1961); large, tanged and tapered-stem projectile points (Type 6) with Yosemite. Finally, small, light projectile points (Types 1, 2 and 3), steatite vessels, flaked scrapers, metates and manos, and various-size tanged, expanding-stem projectile points (Type 4) are shared with all three cultural areas.

One gains the impression that Mammoth Creek Cave may have been a meeting place on a north-south, east-west cross-roads, known and used as a temporary shelter by the historic and prehistoric Western Mono and Yosemite Miwok, as well as the Owens Valley and Mono Lake Paiute. Elsasser notes that in the southern Sierra Nevada, "...there is much evidence of a homogeneous late prehistoric or protohistoric culture, based upon hunting and most probably upon trade as well. It is assumed that this apparent homogeneity may in turn have been based on linguistic kinship of the Shoshonean peoples who lived on either side of the range". (Elsasser 1954:76),



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 well could have been. In the first place it is strategically  
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 Secondly, Mammoth Creek Cave shares Great Valley with  
 possibly with Great Valley to the south and Vermilion Valley  
 to the west. Great Valley is a plateau with numerous  
 to the north, and Nevada and Eastern California sites to  
 the east, recorded by Helzer and Hammett (1961). Large,  
 rounded and tapered-stem projectile points (Type 6) with leaf-  
 like, finely, small, light projectile points (Types 1, 2  
 and 3), ecclesiastical vessels, flaked scrapers, needles and awls,  
 and various-size ranged, expanding-stem projectile points  
 (Type 4) are shared with all three cultural areas.

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 peoples who lived on either side of the range". (Hessner  
 1954: 70)



# STRATIGRAPHIC ASSOCIATIONS

Table 2

| Level       | Desert-Side-Notched Subtypes |        |       | Owens Valley Brown Ware Pots | Glass Beads | Haliotis Bead | Olivella Bead | Large Heavy Proj. Points |
|-------------|------------------------------|--------|-------|------------------------------|-------------|---------------|---------------|--------------------------|
|             | General                      | Sierra | Delta | Pots                         |             |               |               |                          |
| V 0"-6"     |                              | 2      | 1     | 9                            | 18          |               |               |                          |
| IV 6"-12"   | 1                            |        |       | 4                            | 5           |               |               | 3                        |
| III 12"-18" | 1                            |        |       |                              | 4           | 1             | 1             | 2                        |

| Level       | Small Light Proj. Points |                       | Bone disk Beads | Metates | Manos | Flake Scrapers |
|-------------|--------------------------|-----------------------|-----------------|---------|-------|----------------|
|             | Triangular               | Tanged Expanding Stem |                 |         |       |                |
| V 0"-6"     | 1                        | 2                     | 1               |         |       | 4              |
| IV 6"-12"   |                          |                       | 1               |         | 1     | 7              |
| III 12"-18" | 1                        |                       |                 | 1       | 1     | 3              |
| II 20"      |                          |                       |                 |         |       | 1              |

Desert Side-notched points, Owens Valley Brown Ware potsherds, and glass beads, diagnostic of the protohistoric and historic cultural periods are mainly restricted to depths above 12 inches, and numerically concentrated in the upper 6 inch level.

Depth distribution suggests that the Desert Side-notched General Subtype points (Type 1a) are slightly older than the Sierra Subtype (Type 1b); also that the General Subtype predated the use of Owens Valley Brown Ware Pottery in the Cave. A similar temporal relationship is noted by Baumhoff and Byrne (1959:46-7) in regard to Owens Valley (Iny-2) and Vermillion Valley (Fre-115).

Positioning of the Haliotis and Olivella beads, and the larger, heavier projectile points, specifically the triangular (Type 5), tanged, expanding stem (Type 4) and tanged, tapered stem (Type 6) points, in the two lower stratigraphic levels provides evidence that some cultural change took place during human occupancy of the Cave.





lowest side-sloped points, Glen Valley from Point  
Washburne, and glass beads, diagnostic of the archaic  
and historic periods are mainly restricted to deposits  
above 12 inches, and numerically concentrated in the upper  
6 inch level.

Geop classification suggests that the lowest side-sloped  
General subtype points (Type Ia) are slightly older than the  
Stuart subtype (Type Ib), also that the General subtype five-  
dated the use of Glen Valley from Point Washburne in the Cave.  
A similar temporal relationship is noted by Washburne and Lyne  
(1929 10-7) in regard to Glen Valley (Ivy-2) and Yonkville  
Valley (Ivy-12).

Positioning of the Washburne and Stuart beads, and the  
larger, beaver projectile points, especially the triangular  
(Type 3), concentrated, expanding over (Type 4) and carved, referred  
to (Type 5) points, in the lower stratigraphic levels  
provides evidence that some structural change took place during  
human occupancy of the Cave.



## CONCLUSIONS

The overall picture derived from the combined typological, stratigraphic and ethnographic evidence leads to the conclusion that two and possibly three cultural periods are represented in the Mammoth Creek Cave deposits.

There is a late cultural complex which represents the protohistoric and early historic use of Mammoth Creek Cave by the ancestors of the Mono Lake and Owens Valley Paiute, and presumably the Western Mono and Yosemite Miwok. Characteristic traits of the late cultural period are small, light projectile points presumably used with the bow and arrow - Desert Side-notched (Type 1a, b, c), triangular (Type 2), and tanged, expanding stemmed (Type 3); Owens Valley Brown Ware Pottery, steatite vessels, flake scrapers, Great Basin Painted pictographs, and glass trade beads. The glass bead types recovered from Mammoth Creek Cave suggest mid-19th century as the terminal occupation date. Since Bennyhoff and others (Bennyhoff and Helzer 1958) suggest A. D. 1200 as an approximate beginning date for the protohistoric cultural sequence in Yosemite National Park, Owens Valley, and Vermillion Valley, the late cultural complex of Mammoth Creek Cave is tentatively assigned to the period between A. D. 1200 and A. D. 1850.

Preceding and perhaps overlapping with the protohistoric period is a cultural period defined by a somewhat larger and heavier projectile point assemblage. The tanged, expanding stem point (Type 4), triangular points (Type 5), and the tanged, tapered stem point (Type 6) are considered to be characteristic traits. The Olivella small disk bead occurs in sites of this temporal horizon as well as in sites of the protohistoric period.

An early period of Cave visitation is tenuously suggested by the presence of the Haliotis square bead (Type 1), the large, heavy, tapered stem point of chert (Type 6) presumably used with the atlatl, 2 large patinated, knife-like tools, and several patinated obsidian flakes.

Although it is not possible to assign a beginning date for human use of Mammoth Creek Cave, the combined archaeological and ethnographic data point to a time span in excess of 700 years, encompassing 2 or possibly 3 cultural periods. The Cave's location in the Jeffrey pines high above the valley floor, and the nature of the cultural deposits rule out the possibility that it was ever a permanent village site. Rather, it seems to have been used from earliest times as a relatively temporary shelter by individuals and/or small family groups while hunting and foraging, and as a trail camp for trading expeditions.



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## ETHNOGRAPHIC STORY

By Genny Schumacher

During the late cultural period Mammoth Creek Cave was sometimes visited by the prehistoric and historic Mono Lake Paiute and Owens Valley Paiute whose cultural patterns, recorded ethnographically by Steward (1933), are described in the following excerpts from Genny Schumacher's excellent summary: "Among the Piutes\* living along the eastern base of the Sierra, was a small group near Mono Lake. These Indians called themselves neither Piutes nor Monos, but "cutza dika", meaning cuzavi eaters - cuzavi being one of their food staples, a fly pupae resembling small white worms which were collected from Mono Lake and dried."

".....The cutza dika were acquainted with other Piute groups. Their neighbors at Benton they called "utu'utu (hot-places people), in Owens Valley "pitana patu" (south place people).....Piute groups were generally peaceful with each other and with their eastern neighbors, the Shoshoni, sometimes intermarrying. The squabbles that occurred usually resulted from one group's trespassing on another's pine-nut or hunting territory; most often they were settled by shouting and hurling stones at the intruders. Each group had a head man who settled disputes and organized the few communal activities such as pine-nut trips and rabbit drives, when the old men held nets in a long crescent to catch rabbits the others drove in and clubbed."

".....the Piutes... lived.. in circular shelters made of poles covered with grass, small branches, and juniper or sagebrush bark. Their summer "house" was rather a sun shade, a roof of branches supported by four willow posts. They hunted deer and mountain sheep occasionally, but subsisted mostly on small game, insects, pine-nuts and seeds. Piuga, a caterpillar that lived part of its life in the Jeffrey pines, was an important food. When smudge fires made the piuga fall from the branches, they were caught in steep-sided trenches encircling the trees (traces of these trenches can still be recognized in the Jeffrey forest), then smoked and dried. They raised no corn and did not plant or cultivate, though Owens Valley Indians diverted streams and irrigated some wild seed plots. The women gathered many kinds of seeds, which they added to a mush of ground pine-nut meal, the staple to which might be added a handful of cuzavi, piuga, other insects, or meat... Surviving through a bitterly cold winter often depended on the year's pine-nut crop. With only simple tools of wood, stone, and bone, they were able to utilize what few materials were at hand for food, clothing and shelter. They made bows from juniper wood, or occasionally mountain mahogany, arrows from willow -

\*... "(spelled also Paiute, Pah Ute, Payuches)"



# ETHNOGRAPHIC STORY

by Garry Bohmacker

During the late colonial period, Hansel Green Lake was sometimes visited by the prospector and historic Hans Lake. Hans and Green Valley lakes share cultural patterns, the-  
cultural ethnography by Garry (1973), are described in  
the following excerpt from Garry Bohmacker's excellent summary  
"among the Pines" living along the eastern base of the Sierra,  
was a small group near Hans Lake. These Indians called them-  
selves neither Pines nor Hans, but "cousin Pines", meaning  
cousin Pines - always being one of their food sources, a fly  
paper resembling small white worms which were collected from  
Hans Lake and dried.

.....The Pines were associated with other Pines  
groups. Their neighbors at Hans Lake were called "cousin Pines"  
(Pines people), in Green Valley "Pines Pines" (Pines Pines  
people). These groups were generally associated with each  
other and with their eastern neighbors, the Pines, sometimes  
intermarrying. The specialties that occurred usually resulted  
from one group's trespassing on another's pine-nut or hunting  
territory; most often they were settled by shooting and hunting  
as the Indians. Each group had a head man who settled  
disputes and organized the few communal activities such as  
pine-nut crops and rabbit drives, when the old men held  
in a long process to each rabbit the other drive in and  
eluded.

.....The Pines lived in circular shelter made  
of poles covered with grass, small branches, and juniper or  
sagebrush bark. Their summer "house" was rather a sun shade,  
a roof of branches supported by four willow poles. They  
lived near and around the Pines occasionally, but subsisted  
mainly on small game, insects, pine-nut and seeds. Pines, a  
cousin Pines lived part of its life in the Jeffrey Pines,  
was an important food. When enough Pines made the Pines fall  
from the branches, they were taken in steep-sided trenches  
excavating the trees (traces of these trenches can still be  
recognized in the Jeffrey Pines), then smoked and dried. They  
raised no corn and did not plant or cultivate, though Green  
Valley Indians diverse corn and irrigated some wild seed  
plots. The women gathered many kinds of seeds, which they added  
to a mesh of ground pine-nut meal, the seeds to which might be  
added a handful of tannin, gins, other insects, or meat...  
Surviving through a bitterly cold winter often depended on the  
year's pine-nut crop. With only small seeds of wood, acorn,  
and pine, they were able to utilize what few materials were at  
hand for food, clothing and shelter. They made bows from juniper  
or wood, or occasionally mountain sheepskin, arrows from willow

... ("spelled also Pines, Pines, Pines")



with greasewood forshafts and obsidian points which they wrapped on with sinew and glued with a sticky substance from sagebrush. Traps for small animals were made from looped willow stems. They wove rabbit skins into capes and robes, fiber into nets for fishing and rabbit drives. From local clays they made smoking pipes and a little pottery. They wove beautiful willow baskets of many sizes and shapes - food containers, cooking baskets, hats, cradles, seed beaters, winnowing trays, water bottles (pitch-coated inside). A small group from Mono Lake occasionally crossed the Sierra to trade with Yosemite Indians. The men traveled with buckskin bundles slung over their shoulders, the women with large baskets on their backs, tumplines pulling against their foreheads. The baskets were crammed with pine-nuts, pieces of obsidian, red and white powder for paint making, cuzavi, smaller baskets, and salt (which had been scraped up from alkali lakes and patted into flat cakes). In return they brought back bead money, acorns, and manzanita and elderberries."

"Despite their rigorous life, the Piutes had their jolly times. Gambling, their favorite amusement, took many forms - wrestling, running, ball games, throwing spears, and most popular of all, the hand game. In this game four small bone sticks, two marked, were hidden in the hands of two partners; an opponent guessed in which hands the unmarked sticks were, betting large amounts of shell beads or goods. After seeds were gathered in fall, Piutes congregated at certain centers for week-long celebrations of dancing and gambling. On winter evenings there was story telling, often about the two favorite characters Coyote and Hai'manu. Both got themselves into all sorts of scrapes, Hai'manu being a rascal and a rogue, Coyote a trickster - greedy, disobedient, and boastful. As related by Jack Stewart, a very old Piute from Big Pine: 'The evil in the world came from Coyote. Wolf and Coyote settled things so that there would always be evil along with good. Evil is clever and talks well, always trying to get you. It makes people dishonest and lazy. But by following a good life, being kind, helpful and generous, you have great power, as I have had.'"

"For some three hundred years after California was discovered by the Spanish explorer Cabrillo in 1542, the Piutes continued gathering cuzavi, grinding pine-nuts and living off the land as they always had. By 1825, when about seven thousand Spaniards and Mexicans (plus a few British, Americans and Russians) had settled in California, no white man had yet crossed the immense barrier of the Sierra Nevada nor the deserts of Nevada and Utah."

(Four decades later)... "The Piute's land was theirs no longer. Cattle grazed on the best wild-seed lands, sheep on the deer's brush slopes. Pine-nut trees were cut for fuel. Game and fish, never abundant, became even scarcer. Some of the



with greenwood formulates and opal-like points which they wrapped on with silver and gilded with a silvery substance from nuggets. Traps for small animals were made from jagged willow stems. They were rabbit skins into caps and robes, like into nets for fishing and rabbit drives. From local alga they made smoking pipes and a little pottery. They were beautiful willow baskets of many sizes and shapes - food containers, cooking baskets, hats, cradles, seed baskets, winnowing trays, water bottles (piped-capped inside). A small group from Mono Lake occasionally crossed the Sierra to trade with Yosemite Indians. The men traveled with buckskin bundles along over their shoulders, the women with large baskets on their backs, sometimes pulling against their forebodies. The baskets were crammed with pine-nuts, pieces of apalishan, red and white powder for paint making, curraw, smaller baskets, and nails (which had been scraped up from algal lakes and passed into this camp). In return they brought back beads, money, sear, and manzanita and elderberries.

"Despite their rigorous life, the Pines had their jolly times. Gambling, their favorite amusement, took many forms - wrestling, running, ball games, throwing spears, and most popular of all, the hand game. In this game four small bone sticks, two marked, were hidden in the hands of two partners, an opponent guessed in which hands the unmarked sticks were, betting large amounts of shell beads or goods. After weeks were gathered in fall, Pines congregated at certain centers for week-long celebrations of dancing and gambling. On winter evenings there was story telling, often about the two favorite characters Coyote and Kit'annu. Both got themselves into all sorts of scrapes, Kit'annu being a rascal and a rogue, Coyote a trickster - greedy, dishonest, and powerful. As related by Jack Howards, a very old Pines from Big Pine: 'The evil in the world came from Coyote. Well and Coyote created things so that there would always be evil along with good. But it is clever and sly, well, always trying to get you. It makes people dishonest and lazy. But by following a good life, being kind, helpful and generous, you have great power, as I have had.'

"For some three hundred years after California was discovered by the Spanish explorer Cortes in 1542, the Pines continued gathering curraw, grinding pine-nuts and living off the land as they always had. By 1832, when about seven thousand Spaniards and Mexicans (plus a few British, Americans and Russians) had settled in California, no white man had yet crossed the immense barrier of the Sierra Nevada nor the deserts of Nevada and Utah."

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Piutes fought back; many began working for the white man."  
(Schumacher 1959:128-34)

It is hoped that the partial story unfolded through the excavation of Mammoth Creek Cave will make a contribution to the ultimate history of aboriginal occupation in this area.



Places fought back, many began working for the white man.  
(Schwartz 1959: 128-29)

It is hoped that the partial survey included through the  
excavation of Mammoth Cave will make a contribution to  
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## EXPLANATION OF ILLUSTRATIONS

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- Figure 1 Projectile point types.
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C. Section E (Level I). Lower surface of Level II is marked by arrow.
- Plate 3 Projectile points.  
A. Level V (0-6")  
a. EA-1 Small side-notched, base-notched projectile point. Material: black opaque obsidian; length (minus tip) 14 mm; width 10 mm; thickness 2 mm; weight 0.4 gms.  
b. EA-7 Small side-notched, base-notched projectile point. Material: black opaque obsidian; length (minus tip) 19 mm; width (reconstructed) 12 mm; thickness 3 mm; weight 0.6 gms.  
c. EA-11 Small side-notched projectile point with V-shaped base, serrated blade and exquisite diagonal flaking. Material: dark-gray translucent obsidian; length (minus tip) 30 mm; width (reconstructed) 12 mm; thickness 3.5 mm; weight 1.2 gms.



# EXPLANATION OF ILLUSTRATIONS

Map 1 Location of Mammoth Creek Cave and comparative archaeological sites.

Figure 1 Projectile point types.

Figure 2 Pottery rim-shoulders, glass, shell, and bone beads.

Figure 3 Sketch of riparian cave.

Figure 4 Plan of cave showing profile of excavation.

Figure 5 A. Plan of horizontal grid and wing of cave.

B. Profile of vertical levels.

Plate 1 A. Setting of Mammoth Creek Cave, Mammoth Mountain in background. Mammoth Pass shows Mammoth Mountain on the left. Cave is located in forested area between foreground and Mammoth Mountain.

B. Mammoth Creek Cave mouth of Cave #1.

C. Preliminary survey mouth of Cave #1.

Plate 2 A. Partial excavation Basin A as arrow

B. Pit of concentrated charcoal and ash (center) in level II after excavation.

C. Section B (level I). Lower surface of level II is marked by arrow.

Plate 3 Projectile points.

A. Level V (0-6")

a. MA-1 Small side-notched, base-notched projectile point. Material black opaque obsidian. Length (minus tip) 14 mm; width 10 mm; thickness 3 mm; weight 0.4 gms.

b. MA-2 Small side-notched, base-notched projectile point. Material black opaque obsidian. Length (minus tip) 19 mm; width (reconstructed) 12 mm; thickness 3 mm; weight 0.6 gms.

c. MA-3 Small side-notched projectile point with V-shaped base, serrated blade and expanded distal flaring. Material dark-gray translucent obsidian. Length (minus tip) 30 mm; width (reconstructed) 12 mm; thickness 3.5 mm; weight 1.2 gms.



- d. EA-12 Small triangular projectile point with straight base, slightly convex sides. Material: clear gray banded obsidian; length 31 mm; width 15 mm; thickness 3 mm; weight 1.6 gms.
  - e. EA-10 Small tanged projectile point with expanding stem and straight base. Material: dark-gray opaque obsidian; length 30 mm; width 20 mm; thickness 3 mm; weight 1.7 gms.
  - f. EA-4 Small tanged projectile point with expanding stem and convex base. Material: black opaque obsidian; length 27 mm; width (reconstructed) 20 mm; thickness 3 mm; weight 1.45 gms.
  - g. EA-3 Mid-section and tip of small stemmed projectile point. Material: black opaque obsidian.
  - h. EA-6 Unclassified projectile point fragment. Material: dark-gray opaque obsidian.
  - i. EA-2 Tip and mid-section of slender, finely flaked projectile point nearly strangulated at the basal end. Material: clear black-toned obsidian.
  - j. EA-8 Mid-section of small delicately flaked projectile point. Material: black opaque obsidian.
  - k. EA-9 Basal portion of small point or knife. Material: clear obsidian.
  - l. EA-5 Mid-section of projectile point or knife. Material: dark-gray opaque obsidian.
- B. Level IV (6-12")
- a. EA-18 small side-notched, concave based projectile point. Material: black opaque obsidian; length 29 mm; width (reconstructed) 13 mm; thickness 3.5 mm; weight 0.9 gms.
  - b. EA-19 Medium-sized heavy tanged projectile point with expanding stem, concave base and serrated blade. Material: black opaque obsidian; length 40 mm; width (reconstructed) 26 mm; thickness 8.5 mm; weight 5.1 gms.
  - c. EA-14 Base of large heavy tanged point with a tapered stem. Material: pinkish-gray and tan mottled chert; width 27 mm; thickness 8 mm. weight (base) 4.9 gms.
  - d. EA-16 Base of triangular straight based projectile point. Material: clear black-toned obsidian; width 19 mm; thickness 4 mm; weight (base) 1.75 gms.



5. EA-12 Small triangular projectile point with straight base, slightly convex sides. Material clear gray. Banded obsidian, length 31 mm, width 12 mm, thickness 3 mm, weight 1.5 gms.

6. EA-10 Small ranged projectile point with expanding stem and straight base. Material dark-gray opaque obsidian, length 30 mm, width 20 mm, thickness 3 mm, weight 1.7 gms.

7. EA-11 Small ranged projectile point with expanding stem and convex base. Material black opaque obsidian, length 17 mm, width (reconstructed) 20 mm, thickness 3 mm, weight 1.45 gms.

8. EA-1 Mid-section and tip of small stemmed projectile point. Material black opaque obsidian.

9. EA-6 Unfinished projectile point fragment. Material dark-gray opaque obsidian.

10. EA-2 Tip and mid-section of slender, finely flaked projectile point, nearly straight at the base and. Material clear black-soned obsidian.

11. EA-5 Mid-section of small delicately flaked projectile point. Material black opaque obsidian.

12. EA-3 Basal portion of small point or knife. Material clear obsidian.

13. EA-4 Mid-section of projectile point or knife. Material dark-gray opaque obsidian.

#### B. Level IV (6-15)

a. EA-16 Small side-notched, concave based projectile point. Material black opaque obsidian, length 29 mm, width (reconstructed) 17 mm, thickness 3.5 mm, weight 0.9 gms.

b. EA-18 Medium-sized heavy ranged projectile point with expanding stem, concave base and serrated blade. Material black opaque obsidian, length 40 mm, width (reconstructed) 20 mm, thickness 8.5 mm, weight 2.1 gms.

c. EA-14 Base of large heavy ranged point with a tapered stem. Material pinkish-gray and tan mottled chert, width 23 mm, thickness 8 mm, weight (base) 4.9 gms.

d. EA-15 Base of triangular straight based projectile point. Material clear black-soned obsidian, width 12 mm, thickness 4 mm, weight (base) 1.75 gms.



- e. EA-15 Tip of small delicately flaked projectile point. Material: clear obsidian.
- f. EA-22 Mid-section of small projectile point. Material: dark-gray opaque obsidian.
- g. EA-17 Fragment of small side-notched projectile point. Material: clear obsidian.
- h. EA-20 Mid-section of large point or knife. Material: black opaque obsidian.
- i. EA-21 Mid-section of large projectile point or knife. Material: black opaque obsidian.

C. Level III (12-18")

- a. EA-26 Small side-notched, concave-based projectile point. Material: Clear gray-toned obsidian; length (minus tip) 20 mm; width 11 mm; thickness 2 mm; weight 0.4 gms.
- b. EA-24 Small triangular projectile point with straight base, slightly convex sides. Material: black opaque obsidian; length 17 mm; width 13 mm; thickness 2mm; weight 0.7 gms.
- c. EA-23 Base of large heavy tapered stem projectile point with short tangs. Material: black opaque obsidian; width 24 mm; thickness 6.6 mm; weight 3.55 gms.
- d. EA-28 Base and mid-section of long triangular convex-based projectile point. Material: black opaque obsidian; width 26 mm; thickness 5 mm; weight (base) 3.7 gms.
- e. EA-27 Fragment of triangular straight-based projectile point. Material: black opaque obsidian; thickness 3.5 mm.
- f. EA-25 Fragment of triangular convex-based point. Material: black opaque obsidian; thickness 4 mm.

Plate 4 Knives and Scrapers.

- A. EA-16 Large knife-like tool of heavily patinated black obsidian. Large percussion flakes were removed from both faces and the edges lightly retouched by secondary flaking. Length 11.5 cm.; width 4.4 cm.; thickness 2.2 cm.; weight 90.0 gms. Level V.
- b. EA-37 Small carefully flaked triangular knife of black obsidian which may have been hafted. Length 3.3 cm.; width 2.9 cm.; thickness 0.5 cm.; weight 4.0 gms. Level V.



e. EA-15 Tip of small delicately flaked projectile point.  
Material: clear obsidian.

f. EA-22 Mid-section of small projectile point. Material:  
dark-gray opaque obsidian.

g. EA-17 Fragment of small side-notched projectile point.  
Material: clear obsidian.

h. EA-20 Mid-section of large point or knife. Material:  
black opaque obsidian.

i. EA-21 Mid-section of large projectile point or knife.  
Material: black opaque obsidian.

### c. Level III (11-15)

a. EA-26 Small side-notched, concave-based projectile point.  
Material: Clear gray-toned obsidian (minus tip)  
20 mm. width 11 mm. thickness 5 mm. weight 0.4 gm.

b. EA-24 Small triangular projectile point with straight base,  
slightly convex sides. Material: black opaque obsidian  
length 17 mm. width 13 mm. thickness 2 mm. weight 0.7 gm.

c. EA-23 Base of large heavy tapered stem projectile point  
with sharp angles. Material: black opaque obsidian, width  
14 mm. thickness 0.8 mm. weight 3.25 gm.

d. EA-28 Base and mid-section of long triangular convex-based  
projectile point. Material: black opaque obsidian, width  
20 mm. thickness 5 mm. weight (base) 3.7 gm.

e. EA-27 Fragment of triangular straight-based projectile point.  
Material: black opaque obsidian, thickness 3.5 mm.

f. EA-25 Fragment of triangular convex-based point. Material:  
black opaque obsidian, thickness 4 mm.

### Phase 4: Knives and Scrapers

A. EA-30 Large knife-like tool of heavily patinated black  
obsidian. Large perforation flake was removed from back  
face and the edges lightly retouched by secondary flaking.  
length 11.5 cm. width 4.4 cm. thickness 2.2 cm. weight  
90.0 gm. level V.

b. EA-37 Small carefully flaked triangular knife of black  
obsidian which may have been hollow. length 3.3 cm.  
width 1.9 cm. thickness 0.5 cm. weight 4.0 gm. level V.



- c. EA-39 Knife tip of dark-gray silver sheen obsidian, partially patinated. Thickness 1.0 cm. Level IV.
- d. EA-38 Knife tip of black obsidian. Thickness 0.6 cm. Level V.
- e. EA-42 Well made knife of fine quality black obsidian. Length 7.0 cm.; width 3.1 cm.; thickness 1.4 cm.; weight 28 gms. Surface of Rock-ring.

#### B. Scrapers

- a. EA-44 Triangular side and end scraper with one pointed end. Material: black and gray banded obsidian; length 5.9 cm.; width 3.3 cm.; thickness 0.6 cm. Level V.
- b. EA-45 Triangular side and end scraper with one pointed end. Material: black obsidian; length 4.6 cm.; width 3.5 cm.; thickness 0.6 cm. Level V.
- c. EA-52 Convex-concave side and end scraper. Material: Light-brown gold sheen obsidian mottled with black; length 4.4 cm.; width 4.15 cm.; thickness 0.9 cm. Level IV.
- d. EA-47 Convex side scraper of black obsidian. Length 3.5 cm.; width 2.4 cm.; thickness 1.1 cm. Level IV.
- e. EA-46 Parallel edged side scraper of black obsidian. Length 2.9 cm.; width 1.9 cm.; thickness 0.5 cm. Level V.
- f. EA-54 Straight and concave edged side and end scraper. Material: black obsidian; length 3.3 cm.; width 2.1 cm.; thickness 0.4 cm. Level III.
- g. EA-49 Convex-concave side scraper of black obsidian. Length 4.7 cm.; width 2.6 cm.; thickness 0.7 cm. Lev. IV.
- h. EA-43 Convex side scraper of red obsidian mottled with black. Length 3.7 cm.; width 1.9 cm.; thickness 0.8 cm. Level V.

#### Plate 5 Tools and Bones

##### A. Perforators and flake tools

- a. EA-39 Large heavy convex-edged and pointed tool; re-worked. Material: black obsidian (banded); length 11.1 cm.; width 8.8 cm.; thickness 2.7 cm.; weight 150.0 gms. Level V (0-6").



24-19 Knife tip of dark-gray silver sheen obsidian, partially pitted. Thickness 1.0 cm. Level IV.

24-18 Knife tip of black obsidian. Thickness 0.5 cm. Level V.

24-17 Nail made knife of fine quality black obsidian. Length 7.0 cm., width 1.1 cm., thickness 1.4 cm. Weight 26 gms. Surface of hook-ring.

#### Scrapers

24-16 Triangular side and end scraper with one pointed end. Material black and gray banded obsidian. Length 3.9 cm., width 3.7 cm., thickness 0.9 cm. Level V.

24-15 Triangular side and end scraper with one pointed end. Material black obsidian. Length 4.0 cm., width 3.7 cm., thickness 0.6 cm. Level V.

24-14 Convex-convex side and end scraper. Material light-brown gold sheen obsidian worked with black. Length 4.4 cm., width 4.1 cm., thickness 0.9 cm. Level IV.

24-13 Convex side scraper of black obsidian. Length 3.7 cm., width 3.4 cm., thickness 1.1 cm. Level IV.

24-12 Parallel edged side scraper of black obsidian. Length 3.9 cm., width 1.9 cm., thickness 0.5 cm. Level V.

24-11 Straight and convex edged side and end scraper. Material black obsidian. Length 3.7 cm., width 2.1 cm., thickness 0.4 cm. Level III.

24-10 Convex-convex side scraper of black obsidian. Length 4.7 cm., width 3.6 cm., thickness 0.7 cm. Level IV.

24-9 Convex side scraper of red obsidian worked with black. Length 3.7 cm., width 1.9 cm., thickness 0.6 cm. Level V.

#### Place 3 Tools and Bones

##### Fortification and Flank Tools

24-18 Large heavy convex-edged and pointed tool. Material black obsidian (banded). Length 11.1 cm., width 8.8 cm., thickness 2.7 cm., weight 150.0 gms. Level V (0-5).



- b. EA-54 Thick flake tool with one end modified to form a stubby point - possibly a punch. Material: black obsidian; length 4.8 cm.; width 4.7 cm.; thickness 2.2 cm.; weight 23.0 gms. Level IV (6-12").
- c. EA-53 Small narrow utilized flake with one convex edge and one purposefully-flaked pointed end; heavily patinated. Material: black obsidian; length 3.4 cm.; width 1.8 cm.; thickness 0.5 cm.; weight 1.5 gms. Level IV (6-12").
- d. EA-56 Flake scraper modified by use. Material: black obsidian. Level III (12-18").
- e. EA-53 Thick flake convex-edged side scraper. Material: black obsidian. Level IV (6-12").
- f. EA-51 Small convex-concave and pointed side scraper. Material: black obsidian. Level IV (6-12").

B. Bone

- a. EA-65a Scapula fragment. Level V (0-5").
- b. EA-65b Small rectangular bone fragment. One face is polished and incised with two parallel lines. Level III. (12-18").
- c. EA-65c Fragment of burned bone. Level III (12-18").
- d. EA-74a, b Ungulate rib and jaw fragment - probably deer. Level III (12-18").
- e. EA-74d, e, f Rodentia jaw fragments and tooth. Level III (12-18").

C. Cut and Split Bone

- a. EA-74a, b, c Level V (0-5").
- b. EA-74 d, e, f Level IV (6-12")
- c. EA-74 g, h, i Level III (12-18")
- d. EA-74 j, k Level II (18-24").

Plate 6 Heads of Shell, Bone, Glass

A. Level V (0-5")

- a. EA-32a Cylindrical red opaque glass bead with transparent green center. Type 1.
- b. EA-32f Sub-spherical red opaque glass bead with pinkish-white center. Type 2.



EA-54 Thick flake tool with one end modified to form a sharp point - possibly a punch. Material black obsidian. Length 4.8 cm.; width 4.7 cm.; thickness 2.2 cm.; weight 23.0 gms. Level IV (6-12").

EA-53 Small narrow whittled flake with one convex edge and one purposefully-flaked pointed end; heavily pitted. Material black obsidian; length 3.4 cm.; width 1.8 cm.; thickness 0.5 cm.; weight 1.2 gms. Level IV (6-12").

EA-52 Flake scraper modified by use. Material black obsidian. Level III (12-18").

EA-51 Thick flake convex-edged side scraper. Material black obsidian. Level IV (6-12").

EA-50 Small convex-concave and pointed side scraper. Material black obsidian. Level IV (6-12").

### Zone 2

EA-49a Scapula fragment. Level V (0-6").

EA-49b Small rectangular bone fragment. One face is polished and incised with two parallel lines. Level III (12-18").

EA-49c Fragment of burned bone. Level III (12-18").

EA-49d Mandible rib and jaw fragment - probably deer. Level III (12-18").

EA-49e 2 Rodentia jaw fragments and tooth. Level III (12-18").

### Cut and Shill Bone

EA-49a, b, c Level V (0-6").

EA-49d, e, f Level IV (6-12").

EA-49g, h, i Level III (12-18").

EA-49j, k Level II (18-24").

### Place & beads of Shell, Bone, Glass

#### Level V (0-6")

EA-49a Cylindrical red opaque glass bead with transverse cross center. Type 1.

EA-49b Sub-spherical red opaque glass bead with pinkish-white center. Type 2.



- c. EA-32a Cylindrical white opaque glass bead: Type 4.
- d. EA-33a Mammal bone bead; ring-shaped, smoothed and polished. conically drilled perforation.
- B. Level IV (6-12").
  - a. EA-32p Torus-shaped red opaque glass bead with yellow center: Type 3.
  - b. EA-32n Cylindrical white opaque white glass bead: Type 4.
  - c. EA-33b Mammal bone bead; ring-shaped, smoothed and polished; conically drilled perforation.
- C. Level III (12-18").
  - a. EA-32g Cylindrical red opaque glass bead with transparent green center: Type 1.
  - b. EA-32s Cylindrical white opaque glass bead: Type 4.
  - c. EA-34a Haliotis bead; square with single central perforation: Type 1, No. 65.
  - d. EA-34b Olivella small disk bead: Type 3d.

#### Plate 7 Potsherds and Pictographs

- A. Level V (0-6").
  - a. EA-31c Potsherd? rim section; exterior. Surface.
  - b. EA-31a Potsherd: rim section; interior. Surface.
  - c. Potsherds: interior and exterior surfaces.
- B. Level IV (6-12")

Potsherds; interior and exterior surfaces.
- C. Pictograph designs painted in white on the north wall of the Cave. The highest design, a spoked circle, is 12.0 cm. in diameter, and is placed at a height of 4 feet above floor level.

#### Plate 8 Workshop Material, Manos, Hammerstone, Metate

- A. Workshop Material
  - a. EA-73d Obsidian blank fragment. Level IV (6-12").
  - b. EA-73m Obsidian blank fragment. Level III (12-18").
  - c. EA-46 Obsidian flake scraper modified by use. Level III. (12-18").



- a. EA-32a Cylindrical white opaque glass bead. Type 4.
- b. EA-32b Hemispherical white opaque glass bead with ring-shaped, unnotched and polished, concentric drilled perforation.
- c. Level IV (6-12").
- a. EA-32c Hemispherical white opaque glass bead with yellow center. Type 3.
- b. EA-32d Cylindrical white opaque glass bead. Type 4.
- c. EA-32e Hemispherical white opaque glass bead with ring-shaped, unnotched and polished, concentric drilled perforation.
- d. Level III (12-18").
- a. EA-32f Cylindrical red opaque glass bead with transverse green center. Type 1.
- b. EA-32g Cylindrical white opaque glass bead. Type 4.
- c. EA-32h Hemispherical white opaque glass bead with single central perforation. Type 1, No. 62.
- d. EA-32i Olivella small disk bead. Type 3d.

**Place 7 Potsherds and Pictographs**

- a. Level V (0-6").
- b. EA-31a Potsherd: rim section; exterior surface.
- c. EA-31b Potsherd: rim section; interior surface.
- d. EA-31c Potsherds: interior and exterior surfaces.
- e. Level IV (6-12").
- f. Potsherds: interior and exterior surfaces.
- g. Pictograph design painted in white on the north wall of the Cave. The highest design, a speckled circle, is 12.0 cm. in diameter, and is placed at a height of 4 feet above floor level.

**Place 8 Workshop Material, Bones, Hammerstones, Flints**

- a. Workshop Material.
- b. EA-33a Obsidian blank fragment. Level IV (6-12").
- c. EA-33b Obsidian blank fragment. Level III (12-18").
- d. EA-33c Obsidian flake scraper modified by use. Level III.
- e. (12-18").



- d. EA-73f Obsidian flake. Level III (12-18").
- e. EA-73g Patinated flake of black obsidian. Level IV (6-12").
- f. EA-50 Patinated flake side scraper of black obsidian modified by use. Level IV (6-12").
- g. EA-35 Patinated flake end scraper of black obsidian modified by use. Level III (12-18").
- h. EA-73 Patinated flake of black obsidian. Level IV. (6-12").

B. Manos and Hammerstone

- a. EA-66 Loaf-shaped, sub-rectangular unifaced mano of dense igneous rock. Length 10.6 cm.; width 7.8 cm.; thickness 6.9 cm. Level IV (6-12").
- b. EA-67 Asymmetrical unifaced cobble mano modified by use only. Material: vesicular igneous rock; length 9.2 cm.; width 7.8 cm.; thickness 5.6 cm. (maximum). Level III (12-18").
- c. EA-71 Cone-shaped hammerstone of dense igneous rock. Length 7.0 cm.; maximum thickness 6.5 cm. Level V (0-6").

C. Metate

EA-70 Asymmetric slab metate of fine-grained metamorphic rock. Length maximum 35.0 cm.; maximum width 21.0 cm.; maximum thickness 8 cm. Level III (12-18").



5. BA-131 Obsidian flake. Level III (12-18")

6. BA-132 Fastened flake of black obsidian. Level IV (6-12")

7. BA-133 Fastened flake side scraper of black obsidian modified by use. Level IV (6-12")

8. BA-134 Fastened flake and scraper of black obsidian modified by use. Level III (12-18")

9. BA-135 Fastened flake of black obsidian. Level IV (6-12")

## 10. BA-136 Hammerstone

a. BA-136a Lool-shaped, sub-rectangular unflaked mass of dense igneous rock. Length 10.0 cm.; width 7.8 cm.; thickness 6.9 cm. Level IV (6-12")

b. BA-136b Asymmetrical unflaked cobble mass modified by use only. Material: vesicular igneous rock; length 9.2 cm.; width 7.8 cm.; thickness 5.0 cm. (maximum). Level III (12-18")

c. BA-136c Lool-shaped hammerstone of dense igneous rock. Length 7.0 cm.; maximum thickness 6.5 cm. Level V (0-6")

## 11. BA-137 Pebble

BA-137 Asymmetric slab mass of fine-grained metamorphic rock. Length maximum 35.0 cm.; maximum width 21.0 cm.; maximum thickness 8 cm. Level III (12-18")



Yosemite  
National  
Park



Mono L.

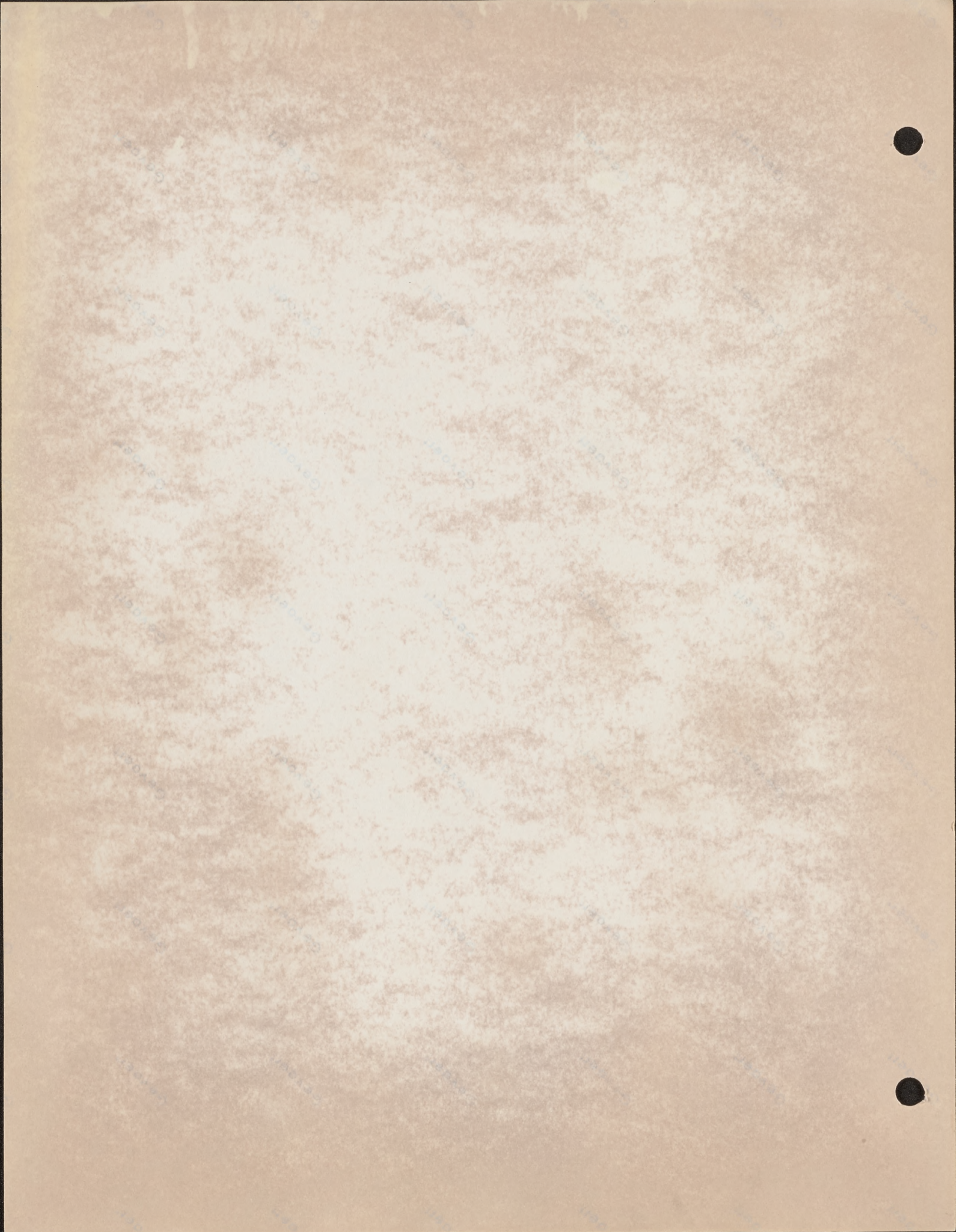
Mammoth Creek Cave  
Fre-115

Owens R.  
Mono Co.  
Inyo Co.

Owens L.  
Iny-2

Map 1









1a: General Sub-type    1b: Sierra Sub-type    1c: Delta Sub-type  
 Type 1: Desert Side-Notched

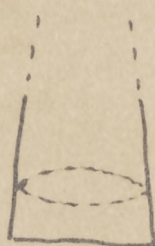


Type 2

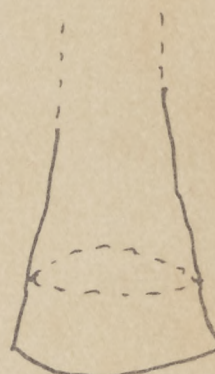
Type 3



j  
 Type 4



k



l

Type 5



m



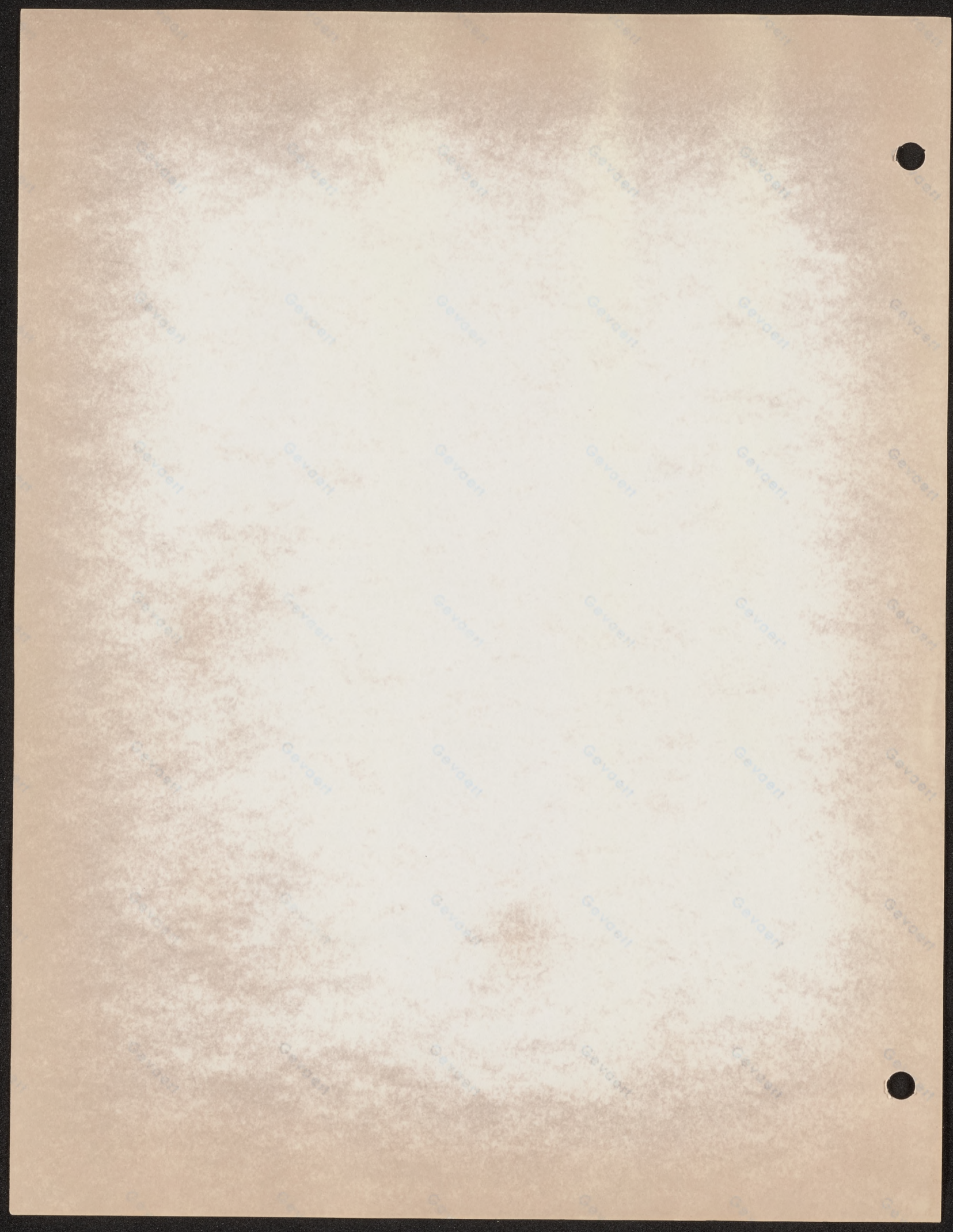
n

Type 6

(1/1)

Figure 1

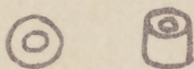




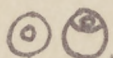




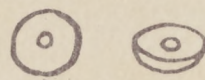
Pottery Rim Sections (1/1)



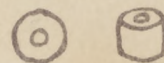
Type 1



Type 2



Type 3



Type 4

Glass Beads (1/1)



Haliotis  
Type 1



Olivella  
Type 3d

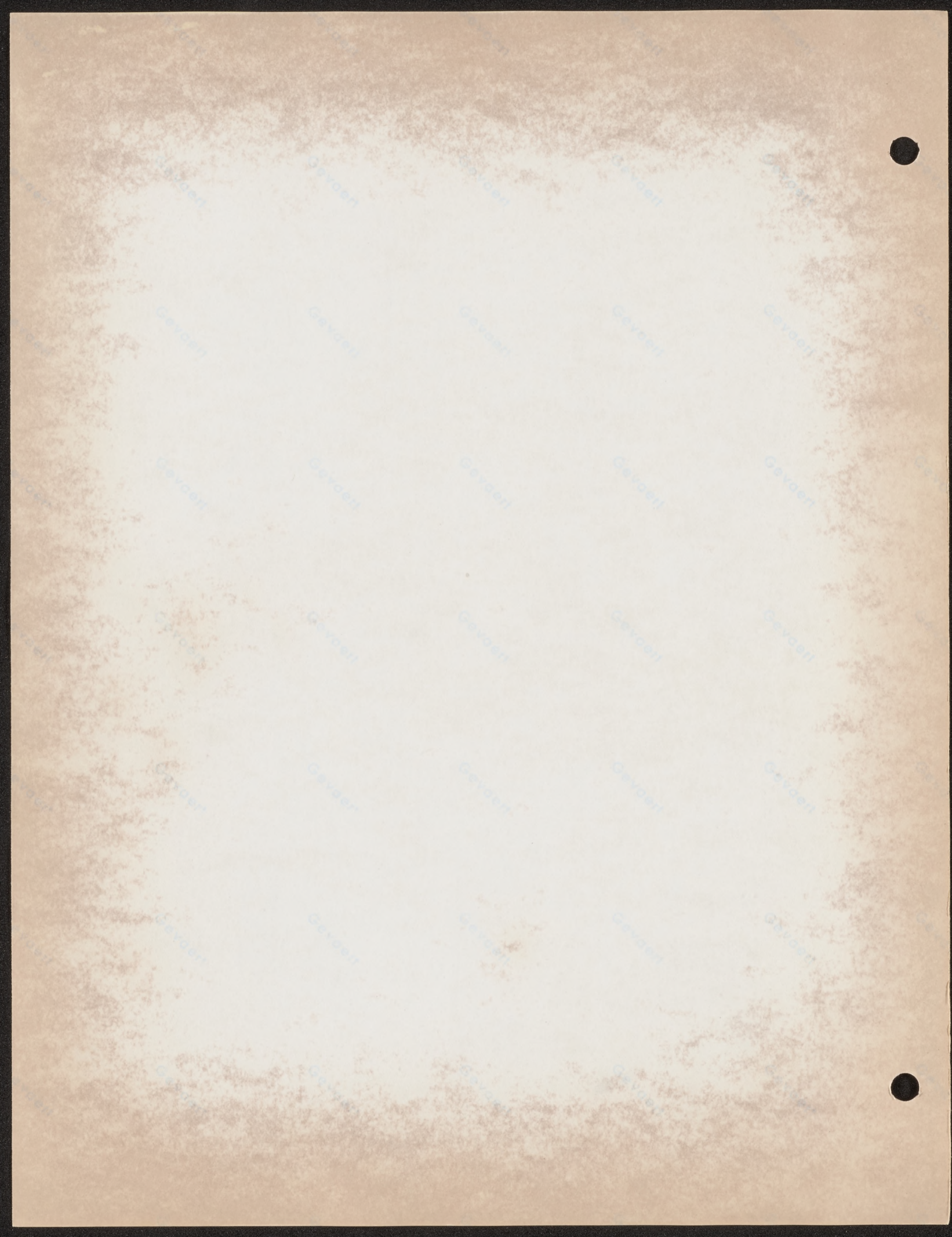


Bone Beads  
(1/1)

Shell Beads  
(1/1)

Figure 2.







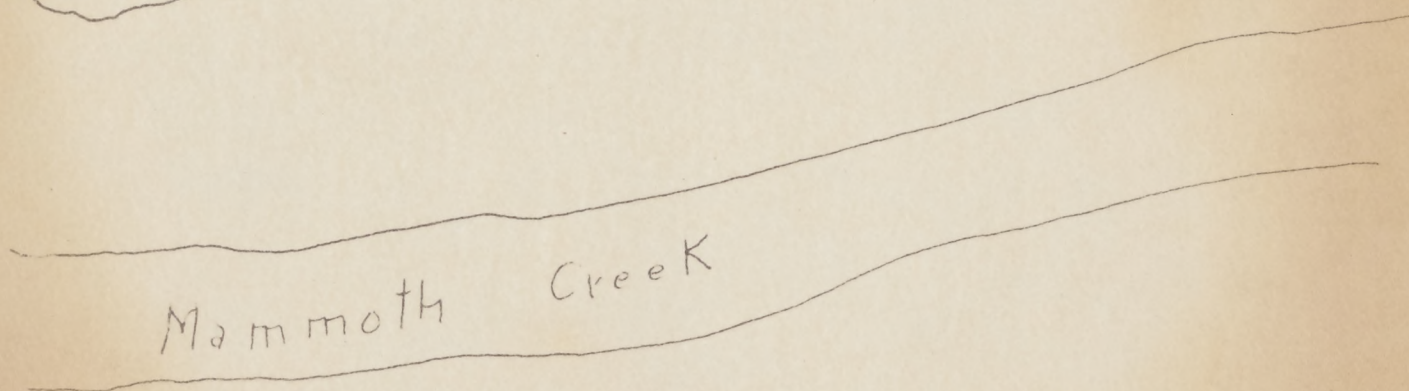
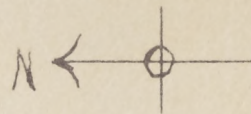
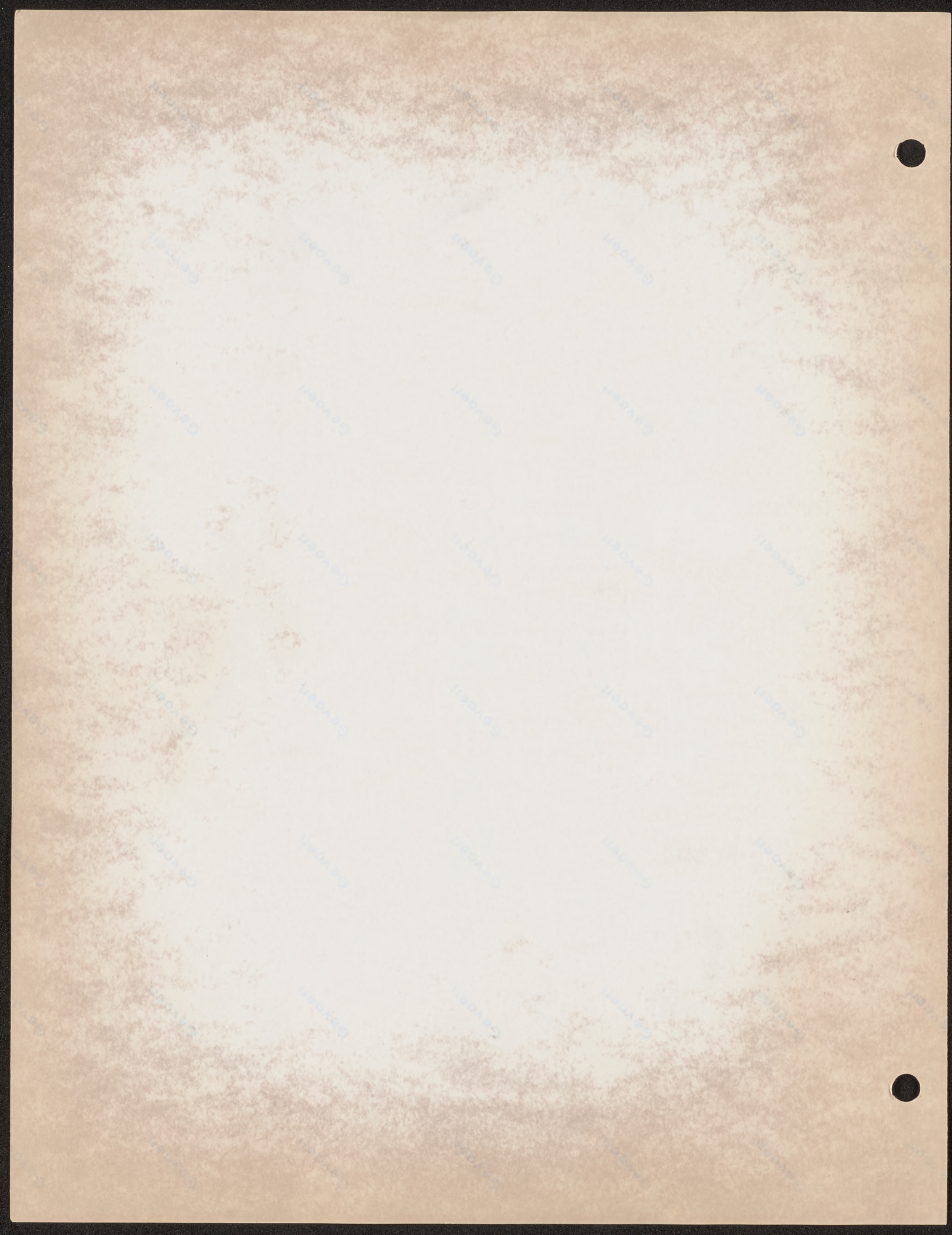


Figure 3.







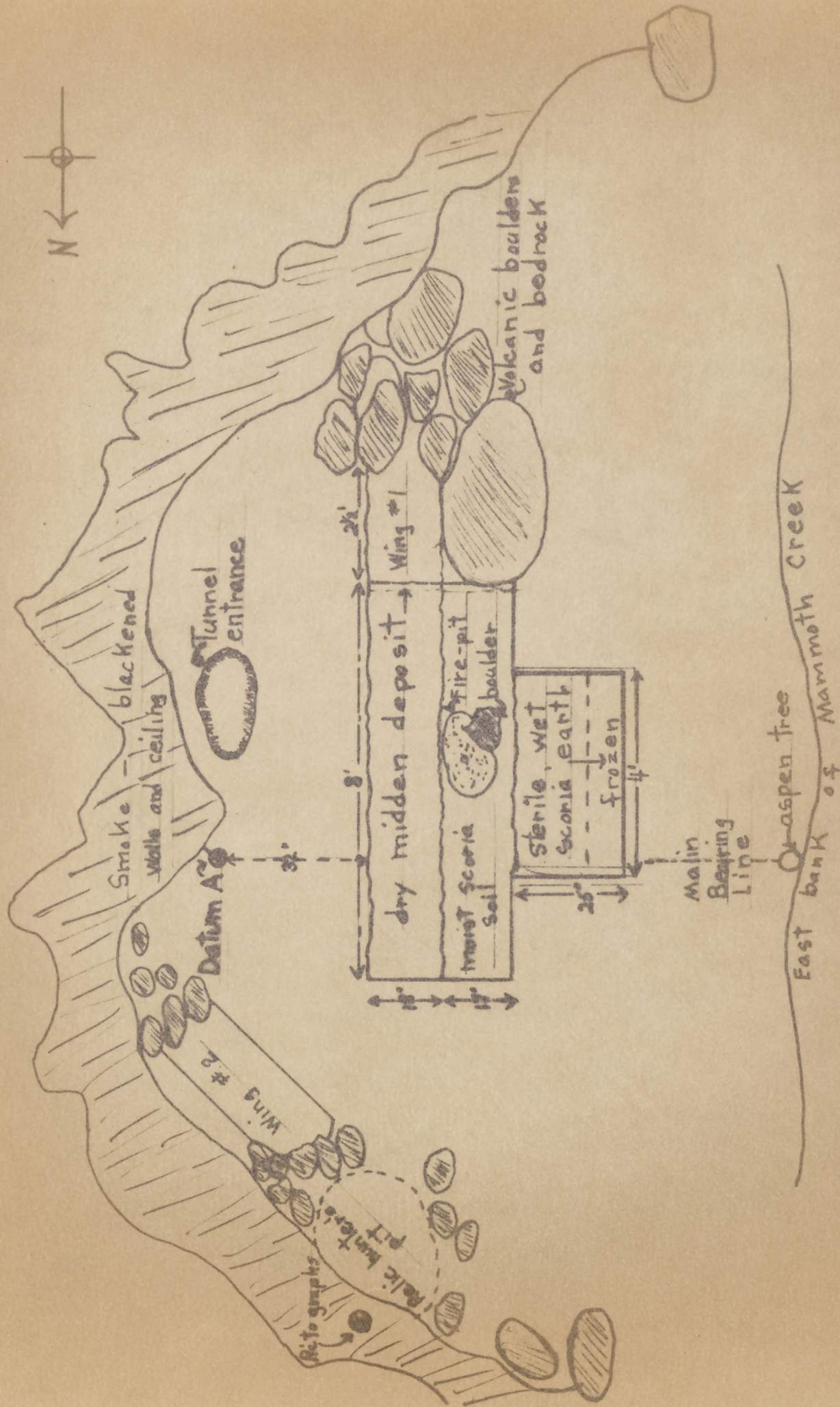
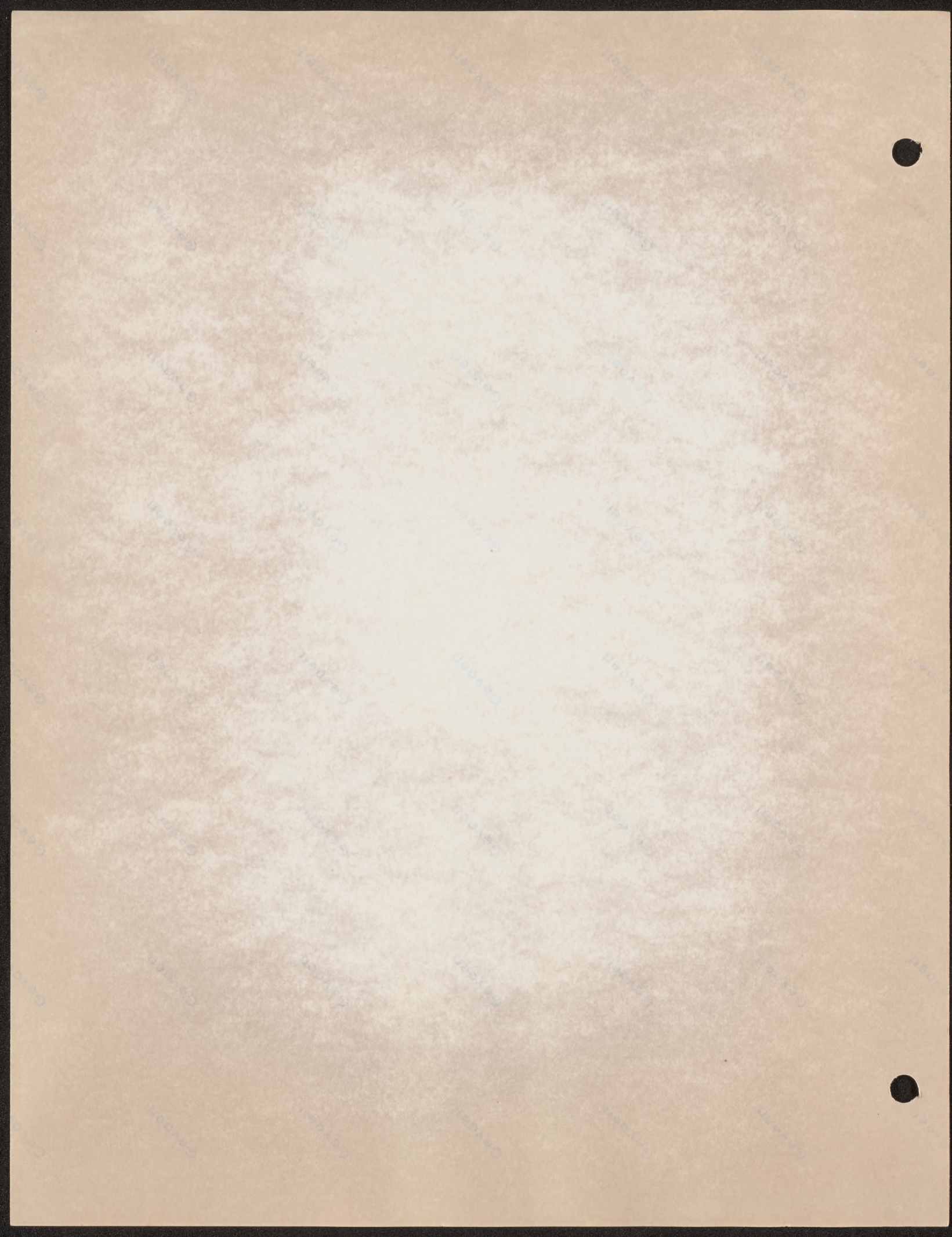
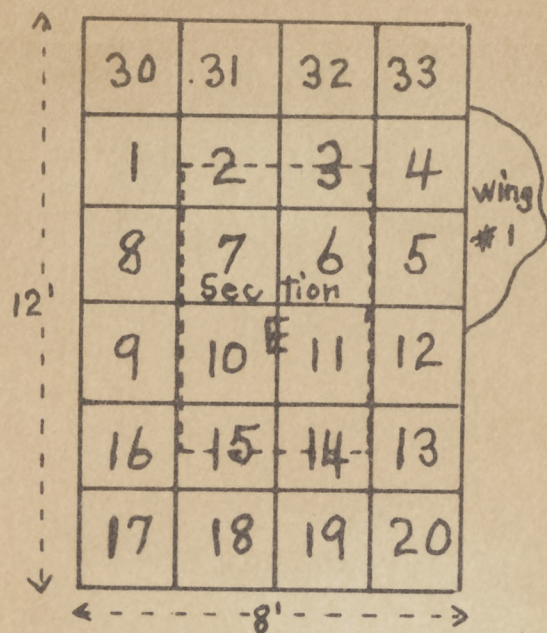


Figure 4

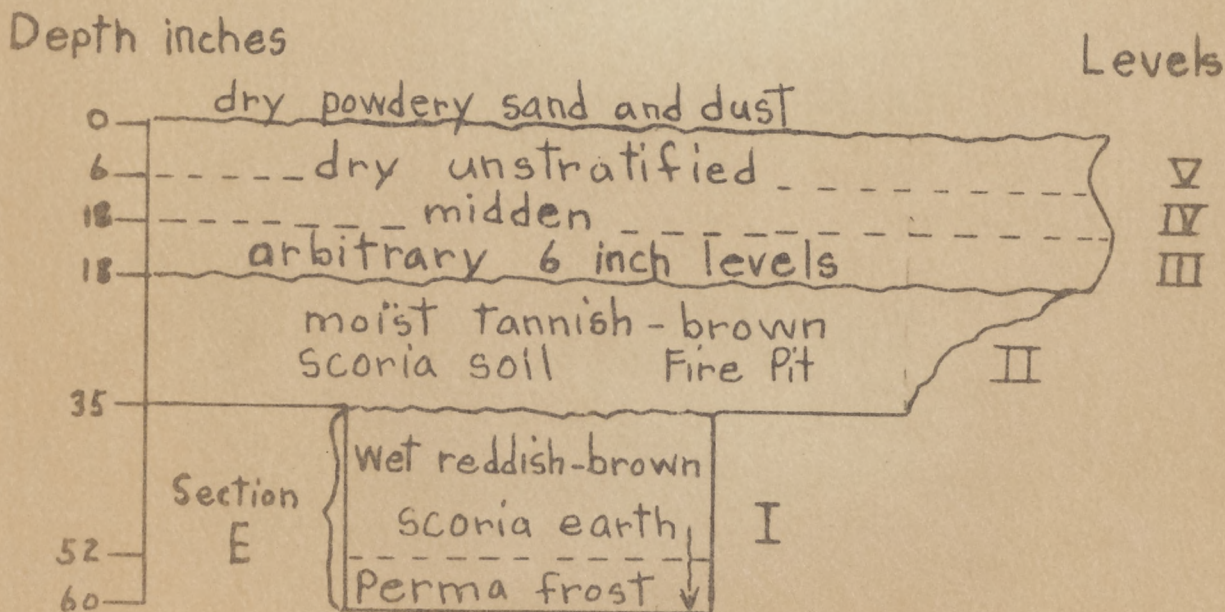








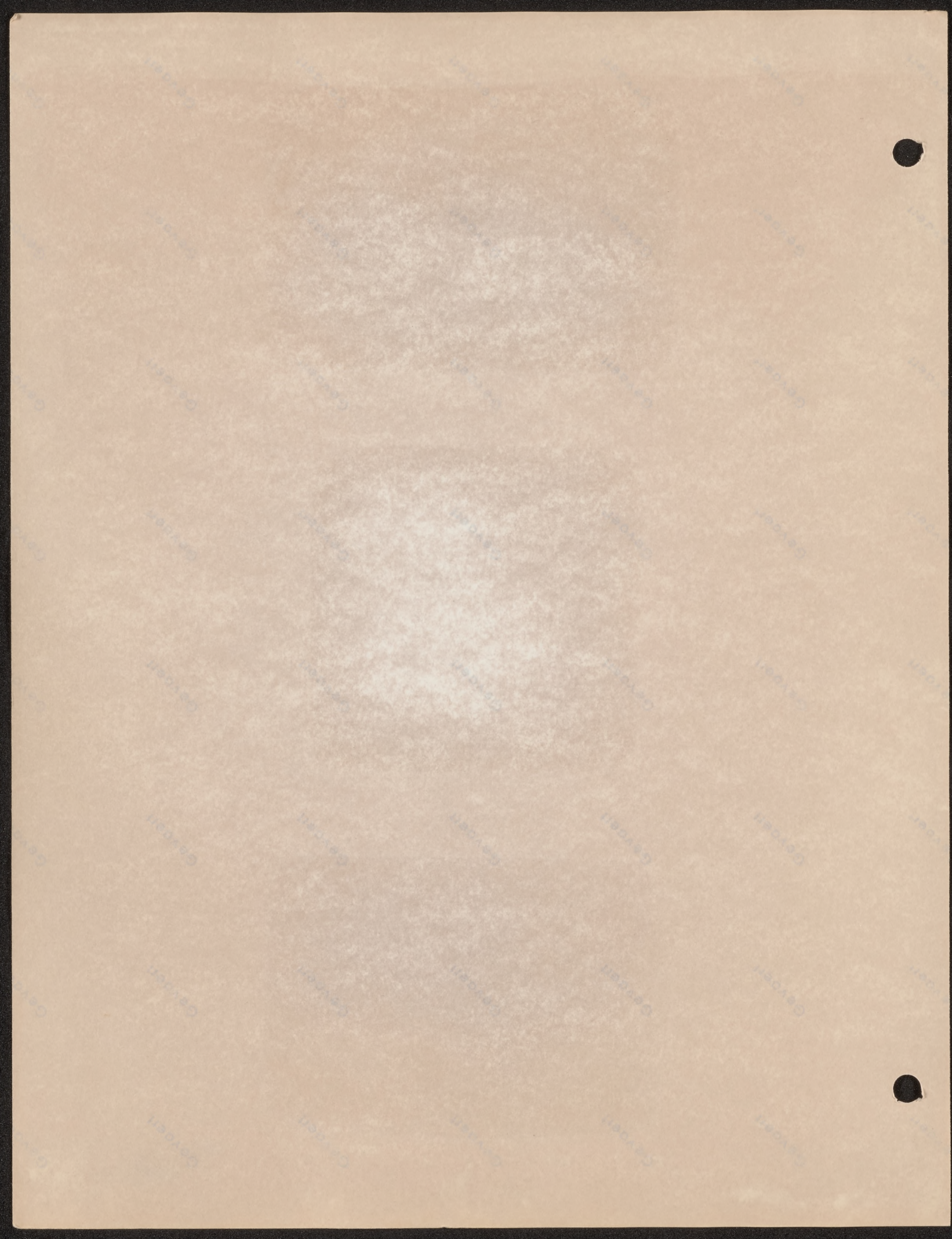
A. Plan of horizontal grid



B. Profile of vertical levels

Figure 5









A



B



C

Plate I



PL-1-A

PL-2

PL-1-C





A



B



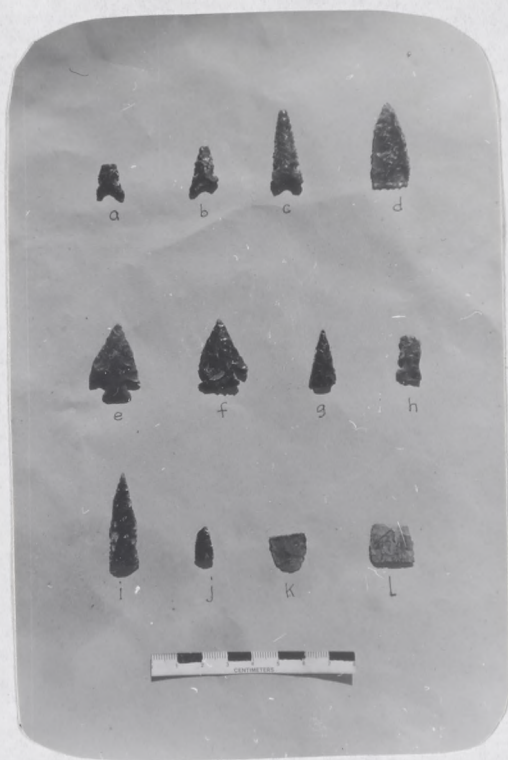
C

Plate 2

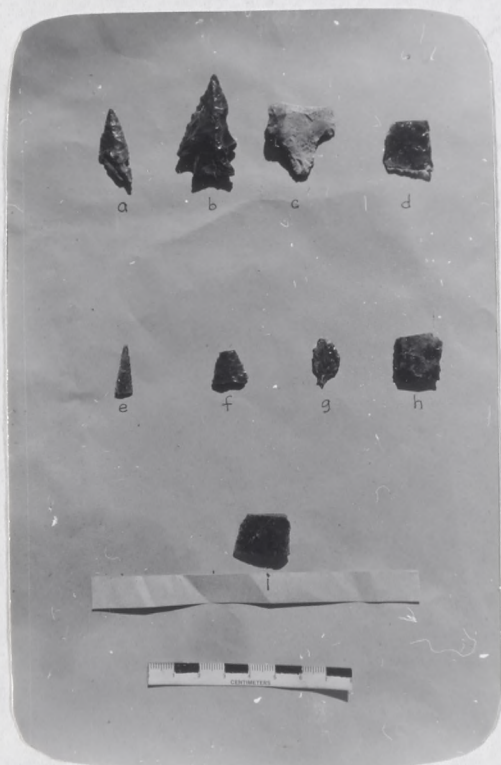




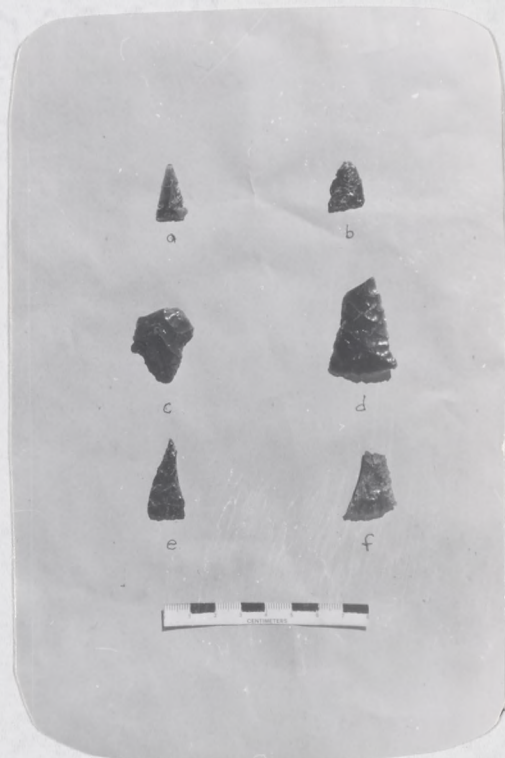




A



B



C

Plate 3

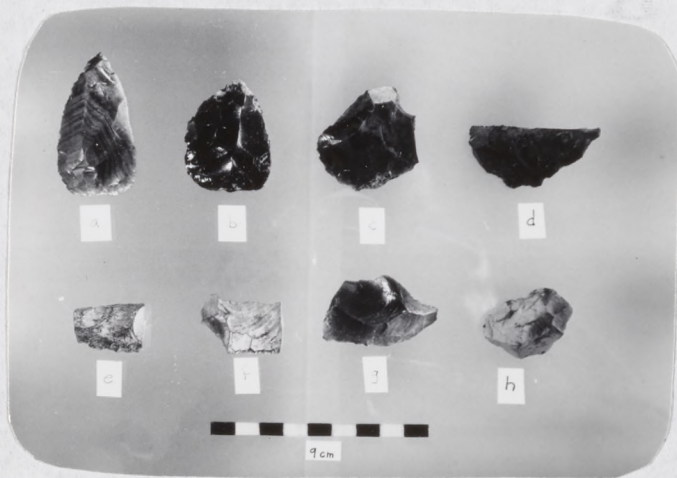








A



B

Plate 4



25% COTTON FIBRE

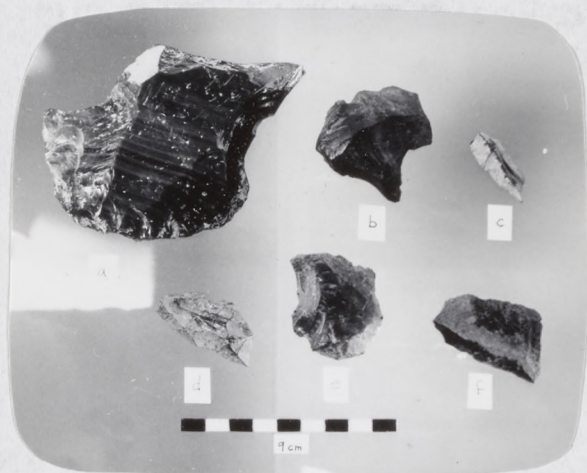


Longport

2000

25% COTTON FIBRE

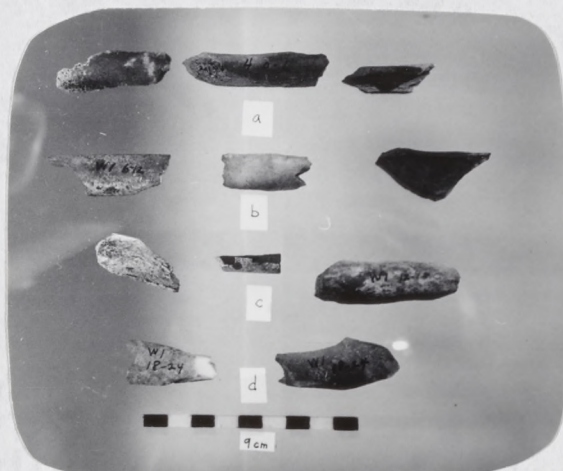




A



B



C

Plate 5



34

A

5B

B

5c







69

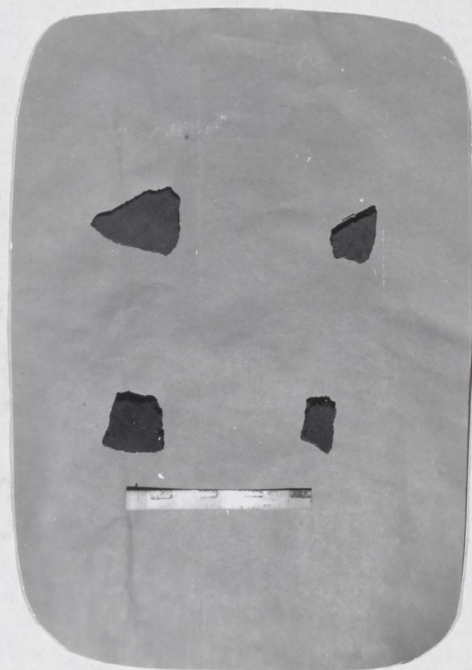
64

6c





A



B



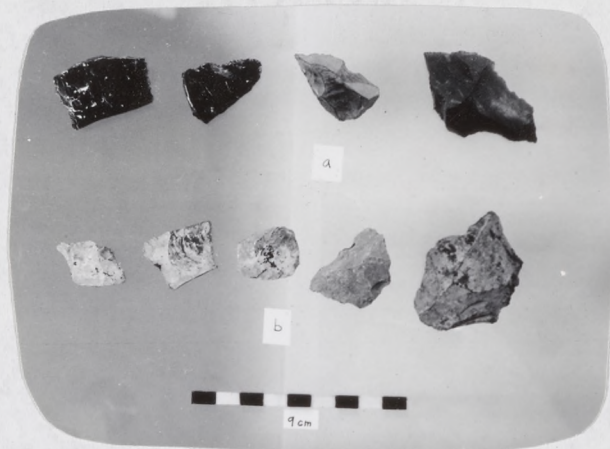
C





Plate 1

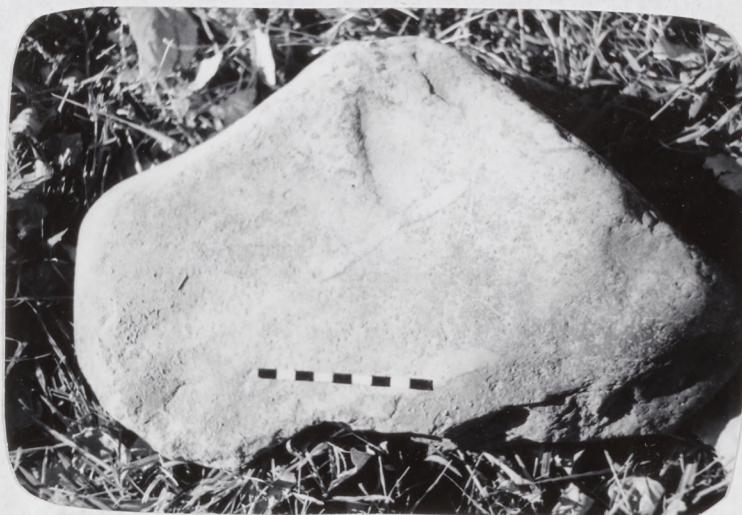




A



B



C

Plate 8







52 COLLOM LEBE

1899

1000000

012



25% COTTON FIBRE

Good

Lincoln

1010





**PRESSBOARD BINDER**  
**GENUINE TYPE 1 PRESSBOARD**  
**STOCK NO. R118-84**



